This Week in The Iron Age

Editorial

Preparedness in Prices 27

Technical Articles

Tool Crib Control 29
Dolling Up the Iron Horse 35
Fatigue Failure II 36
Cutting Steel With Carbides 40
Semi-Permanent Molds 41
Refractory Radiant Tubes 42
Quenching and Quenching Media 45
Grinding and Sanding Castings Without Dust 51
What's New in Welding Equipment 52

Feature Reports

On the Assembly Line 58
Washington News 62

News and Market Reports

News of Industry 68
Personals 98
Obituaries 100
Metal Working Activity 101
Comparison of Prices 102
Summary of the Week 103
The Industrial Pace 104
District Market Reports 106
Machine Tool Activity 110
Non-Ferrous Metal Market 111
Scrap Market and Prices 112
Construction Steel 114
Iron and Steel Prices 116
Ferroalloys, Pig Iron Prices 121
Warehouse Prices 122
Sales Possibilities 124

Fatigue Cracks 66
Products Advertised 150
Index to Advertisers 180

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The Iron Age

SEPTEMBER 12, 1940

ESTABLISHED
1855

Preparedness and Prices

WITH still uncounted millions looming for our defense program, our National overhead is bound to rise sharply. Already it is high because of a staggering National debt. And this overhead can be liquidated in only one of two ways—increased taxation or inflation which is the forerunner of national bankruptcy.

Inflation can be avoided in only one way; by keeping prices down. Every business man will accept this statement as a truthful generality but some will say "our case is an exception."

Friends, in the necessity of avoiding price rises during the coming months, there are no exceptions. It is a matter of self preservation for you to avoid price rises and to discourage them elsewhere. I will tell you why.

Your normal business has been making and selling peace time products. And that is what you expect it to be after this present abnormal emergency.

You have spent thousands upon thousands of dollars educating your customers to buy and use these peace time products. Over a period of years this represents a large investment, whether you make and sell cigarettes or sewing machines, automobiles or baby carriages. If something happens that will get your customers accustomed to going without your products or using them less freely, this investment has been materially damaged.

These customers of yours have certain incomes to spend, whether they be individuals or corporations. The more that they are required to spend, in the way of taxes, for non-productive implements of war, the less they will have to spend for peace time products. *They will begin to learn to do without.*

This year, for example, five billions of dollars are being taken away from normal purchasing power and this is only the beginning.

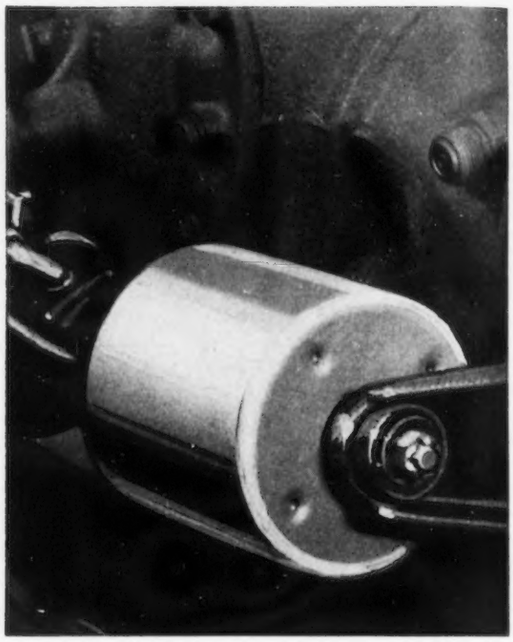
Five billion dollars a year means a lot of doing without. Think that over. If you then add to this merchandising obstacle another hurdle in the way of price rises, you are cutting off your market at both ends.

There are no exceptions. Any man who raises his prices, whether of pins or peanuts or push carts, is helping to cut down your market even though his business is remote from yours.

Self preservation for your business means refraining from price rises in your own back yard and discouraging them in other people's.

J. H. Vanderventer

REJECTIONS CUT 2/3 on difficult draw!



Production cost went down when Inland Sheets were used to form this vacuum cylinder.

Heart of the newest Automatic Gear Shift is this vacuum cylinder, a 4-inch diameter cup, drawn to a 4½-inch depth. And the call is for 8000 parts per day.

Ordinary sheets caused tremendously high breakage rates. An acceptable rejection figure was fixed at three per cent. When Inland Sheets were used, the breakage was brought down to an average of less than one per cent!

That kind of performance is nothing new with Inland Sheets. That's why manufacturers come to depend on Inland Sheets to reduce production costs. They do the job better. They cut waste to the bone. They help you keep output right on schedule. Inland metallurgists are available to work out similar economies for you. Write us today.

1. First draw. Blank and cup.

2. Second draw. Draw to 4½ inches.

3. Trim flash.

4. Embossed, punched and drilled.

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Tool Crib Control of Carbide Tools

By GAYLORD G. THOMPSON
Madison, Wis.

HOW can a shop obtain maximum benefit from the use of carbide tools? The proper place to initiate many changes is at the tool crib; for there the management sets its own house in order and establishes a frame of mind that carries on through the shop. The result is minimization of waste, faster and more satisfactory performance, and lowest possible costs. This article describes how these objectives may be approached through proper tool crib control.

CARBIDE tools, when first introduced in a shop, do arouse a sort of curiosity among the mechanics. Characteristic of human nature, a new article or object usually receives careful handling. But, when daily routine demands constant use of the article or object, there is a tendency toward laxity in its proper care. The old saying, "familiarity breeds contempt" very accurately describes the morale of the machine operators in a shop that is flooded with carbide tools.

The respect of the mechanics for the value of carbide tools cannot be expected when the management shows its own indifference to the tool costs by haphazard distribution and sloppy control. Machine tool operators must be made to feel that carbide tools are hard to get, that carbide tools represent so many five, ten, and twenty-dollar bills in circulation in the shop, and are entitled to the same amount of business skill and trust to obtain from the tool crib as to obtain cash from a bank.

When a mechanic comes to the tool-crib window for a carbide tool, what does he see? Does the attendant keep the tools in some dilapidated group of bench drawers or trays where they are piled like junk? Or are the tools kept in a neat appropriate cabinet with properly labeled draws or compartments? The first condition naturally encourages carelessness and indifference, while the latter creates an impression of value—something that solicits trust from all concerned. The proper psychological effect upon the mechanic at the tool crib window is an important dividend paying factor. Make no mistake about that! If the tools are handled in a disorderly manner in the tool crib, all the missionary work and instructions to the mechanics in the shop as to the proper use of carbide tools, their care and their value, will not be convincing. The management must first put its own house in order.

There are any number of styles and types of cabinets that would prove very appropriate for the storing or filing away of carbide tools. The drawing, Fig. 1, shows a style of cabinet that has proved to be very convenient. It has a capacity of about 4000 assorted tools. About one-half of the capacity of this cabinet would serve a plant employing about 1000 men in the machine-tool industry and leave room for a 50 per cent expansion. The cabinet is about 60 in. high. It has 18 shelves, each shelf containing seven drawers all 2 in. deep by 18 in. long. The first drawer is 4 in. wide. The next two are 4¾ in. wide each, the next three are 6½ in. wide each and the last drawer is 7¾ in. wide. The drawers are made of 16 gage steel spot welded. There is no need for airtight seams. The shelves consist of two studs, each ¾x44 in. long over which is placed ¾ in. pipe spacers 42 in. long and to which is attached angle iron frame end pieces or uprights. A sheet of No. 16 gage steel is fitted across each shelf to serve as a floor," to provide smooth sliding surface for the drawers.

The numbers at the top of the cabinet serve merely to identify each *vertical* row of drawers. The numbers at the left are the *style* numbers of the tools that are kept in the horizontal row of drawers at the right. (The style numbers and their application were covered in an article in THE IRON AGE, May 9.)

Note that the first horizontal row is reserved only for style No. 01 tools, the second row for No. 02 tools and the third row for No. 03 tools and so on. Note also that the first drawer is reserved for tool sizes 1 to 4 and that this same reservation applies to all of the respective tools of these styles and sizes as shown in the vertical column headed by No. 1. For example: No. 1 refers to a tool having a shank size ¼x¼x2¼ in. long; No. 2 refers to a tool having a shank size 5/16x5/16x 2¼ in. long; No. 3 is ⅜x⅜x2½ in.; No. 4 is ½x½x3½ in. long. A style No. 01 tool measuring ¼x¼x2¼ would then be identified as a No. 101 tool. This same method of numbering applies to the other sizes. The first drawer then, in the first row, and

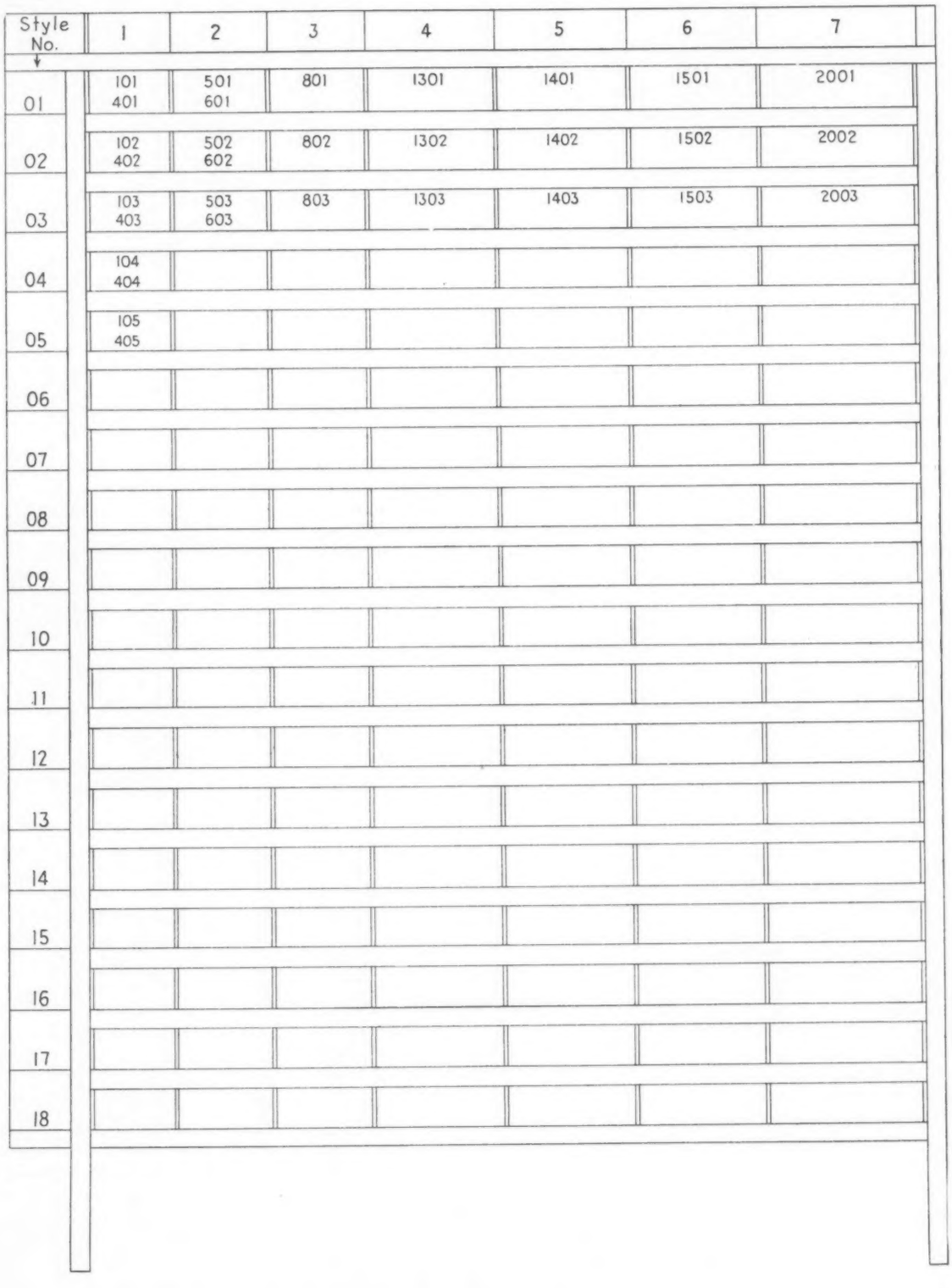


FIG. 1—Style of cabinet which is very useful for the filing of carbide tools. Scale: 1½ in. = 1 ft.

identified as 101-401 would contain all four of the above-mentioned sizes of tools. The next drawer underneath would contain the same sizes of tools but in a *different style*. This continues for each of the next series of drawers down until style No. 18 is reached, if there are that many styles.

The drawers to the right of the first drawer in each *horizontal* row contains tools of similar styles except that *shank sizes are larger* progressively with each drawer. If a tool style No. 01 is desired with a shank measuring ½x1x7 in., it will be assumed that this size of shank is known by No. 13. This tool would, therefore, be identified as No. 1301 and would be found in the top drawer in vertical column No. 4. Note that each *vertical* row is reserved for its respective *sizes* of tools while

o o o

BELOW

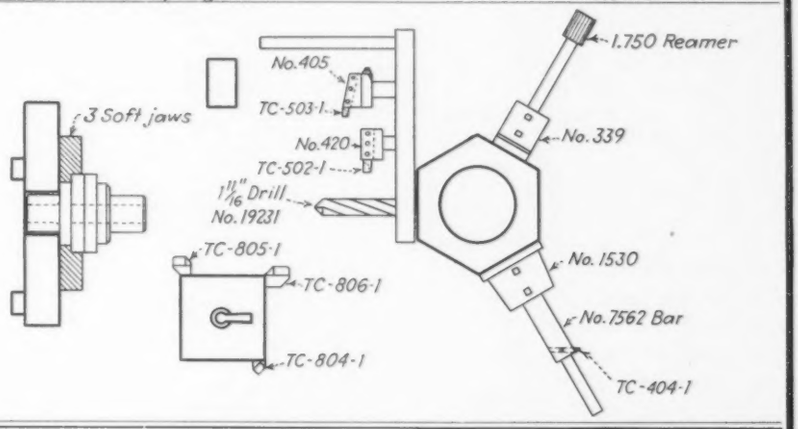
FIG. 3—Celluloid envelope containing a duplicate copy of the layout shown in Fig. 2. The layout is so folded that one side shows the sketch and the other side shows the worded description.

PART NO. A-7434

OPER. NO. 2

DATE 6-17-40 MATERIAL C.I. DWG. NO. 97324

NAME OF PART Coupling MACH. 5 NO. 797



	OPERATIONS		R.P.M.	FEED T. POST	FEED TUR.	CUT FEET
1	Face to clean up, 1 cut	TC-805-1	551	020		325
2	(A) Drill 1 1/16" hole	Carbide drill No. 19231	254		020	110
	(B) Face shoulder, 1 cut	TC-805-1	"	020		200
	(C) Face flange, 1 cut	TC-805-1	"	"		300
3	(A) Bore for ream, 1 cut	TC-404-1	"		020	115
	(B) Turn hub to size, 1 cut	TC-806-1	"	020		175
	(C) Turn shoulder to size, 1 cut	TC-806-1	"	"		200
	(D) Turn flange to size to jaws, 1 cut	TC-806-1	"	"		300
4	(A) Ream 1.750" hole		96		030	44
	(B) Chamfer two edges	*TC-804-1	"	Hd		75

* This tool could be H.S.S. because of low cut feet as controlled by the reaming operation

BY G.G.T. CHECKED G.G.T. PART NO. A-7434

ABOVE

FIG. 2—First copy of tool layout sheet for a coupling.

o o o

the *horizontal* rows are reserved for each *style* of tool. This makes a very convenient filing method for carbide tools.

Tools Are Controlled

Now that an arrangement has been made for proper storage or filing of carbide tools in the tool crib and the tools are in place for distribution, the next step is the actual distribution of the tools in the shop. Certainly there should be no inclination to hand the tools out promiscuously merely for the asking, in exchange for a tool check. "Ya gotta *control* them tools!"

For control it is necessary to have a man that knows the machines in the shop—one who has had a good deal of experience in machine tool set-up and

understands speeds and feeds and capacities of machines and can talk the machine shop language with any mechanic. If no man like this is available, then it becomes necessary to make one. Pick out a man that has the fundamental qualities and then turn him loose in one department or section of the shop. Let him accumulate data as to machine feeds and speeds and tooling facilities and acquire a knowledge of the personal habits of the workers and the general routine of mechanical tolerances and machining methods. Let him make a number of "tool-point" layouts of carbide tool set-ups until such a time as his knowledge of the mechanical equipment will permit him to make layouts from blueprints in the office.

The form and style of layout can be designed to suit the purpose of each individual plant. One style of layout is shown in Fig. 2 wherein the layout is for a coupling, part No. A-7434, operation No. 2. Bear in mind that there is no necessity for maintaining relativity of dimensions. All that is desired is the sketch of the respective tools that constitute the set-up of that particular operation and the number that identifies each individual tool.

The illustrating and numbering of the tools is all supplemented by the description of the sub-operations and the listing of the speeds and feeds and cut-feet and the tools used in that particular sub-operation. Note that the tool number is shown on the illustration of the tool and also tied in with the description of the sub-operation. This layout is made in triplicate. The original is kept in the office file, the duplicate is placed in a transparent (celluloid) envelope to be sent to the tool crib for its files and the third copy is sent to the time-study department for its use to make rate changes because of the installation of carbide tools.

The envelope containing the duplicate copy for the tool crib is shown in Fig. 3. The layout is so folded that one side shows the sketch of the tools used and the other side shows the worded description of the sub-operations and their respective speeds and

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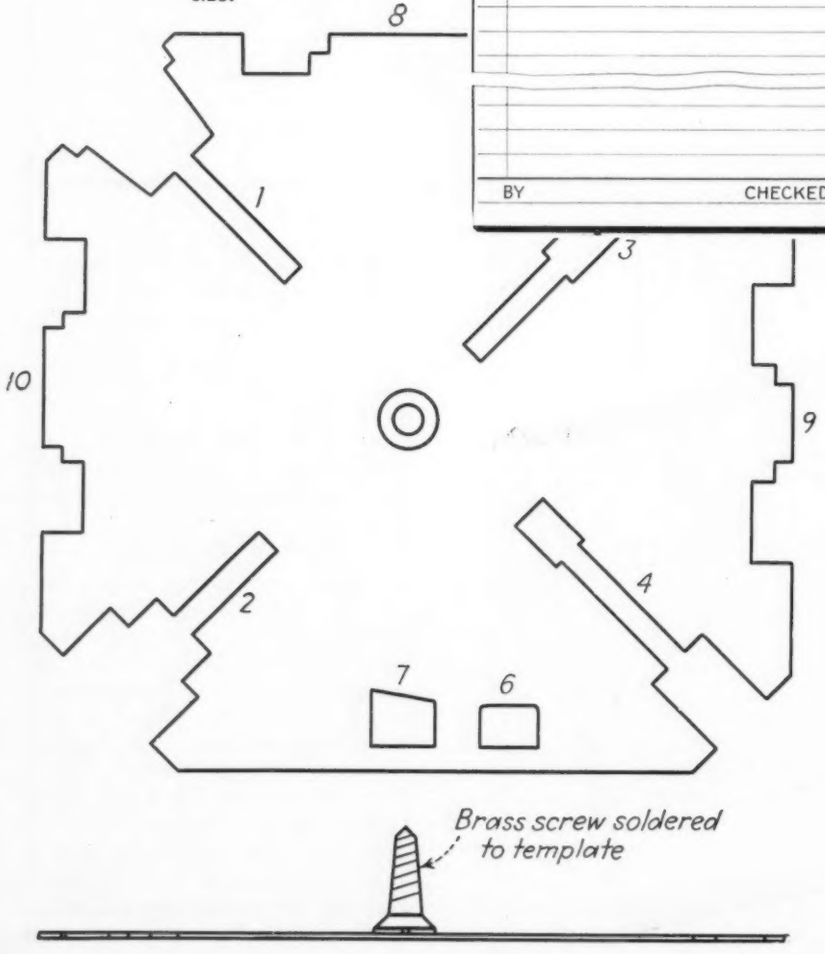
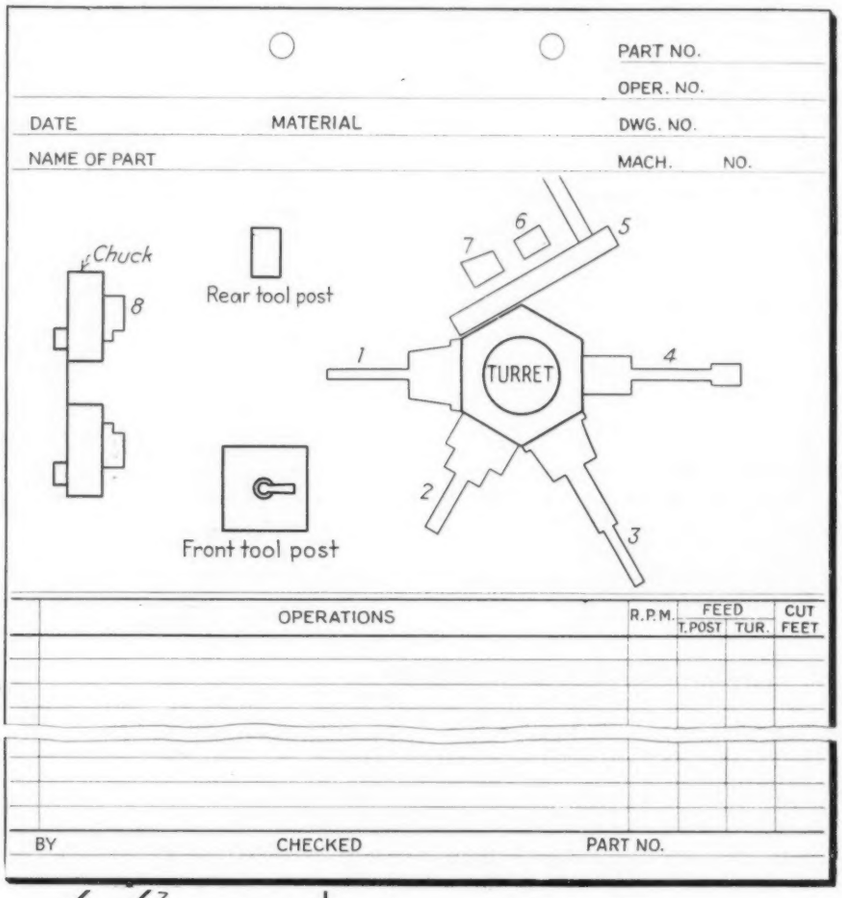
FIG. 4—Template made from 20-gage sheet copper. The brass screw is for use as a handle. Full size.





ABOVE

FIG. 5—This shows how the template forms the outline of the tools used in the layout.

o o o

feeds. The layout as shown is fictitious and is not an example of an actual operation. It is merely for illustration.

Attention is called to the apparent inconsistencies of the cut-feet rates as shown in the extreme right column of the layout in Fig. 2. This is due to the fact that where simultaneous operations are performed, the operation having the largest diameter is the controlling factor in the speed of that particular group of operations. For example: Operation No. 1 is performed with one independent tool, namely TC-805-1, and consequently can take the full 325 cut-feet capacity. Operation No. 2 is different. There is a series of three operations as designated by A, B, and C, which work simultaneously. Operation C has the largest diameter, therefore all other operations are controlled by that operation as shown. The same applies to operation No. 3, D, where the same condition is experienced. All simultaneous operations are shown by the alphabetical designation listed after each operation number.

It is not always possible to establish the correct and most efficient cut-feet speed for operating carbide tools on some machine tools. Usually there is a gap between speed changes that makes it imperative that the next best speed be used. If a machine has a speed of 150 r.p.m. which makes a cut-feet of 200 and the next speed change would be 250 r.p.m. and would produce an excessive cut-feet, then it is natural that the 150 r.p.m. speed would be chosen.

Considerable difficulty has been experienced because of the limitations of machine speeds in acquiring the full efficiency of carbide tools. Time study departments that practice the setting of rates on standard cut-feet speeds are often in error because the limitations of speed changes on machines do not always permit the equaling or bettering of the cut-feet data used in establishing piece rates.

Referring again to the matter of layouts, it might be well to mention how the layout man can adopt some kinks to help his own efficiency. Assuming that he is provided with a drafting table, the first thing required would be some material covering that would be hard and would withstand the imprint of the pencil and produce clear cut carbon copies. A piece of ¼-in. plate glass 24x36 in. makes an excellent foundation upon which to draw the layouts in triplicate. The glass is not only cleaner but also has the added advantage of transparency so that layout data of all kinds can be conveniently placed underneath for quick reference. The layout forms are held in place on the glass by adhesive tape. It is well to wind several wrappings of the tape around the straight edge to hold it up off the paper so that the moving of the straight edge does not smear the carbon copies of the layouts. Glue a small piece of wood on each triangle or irregular curve that is used. This will facilitate move-

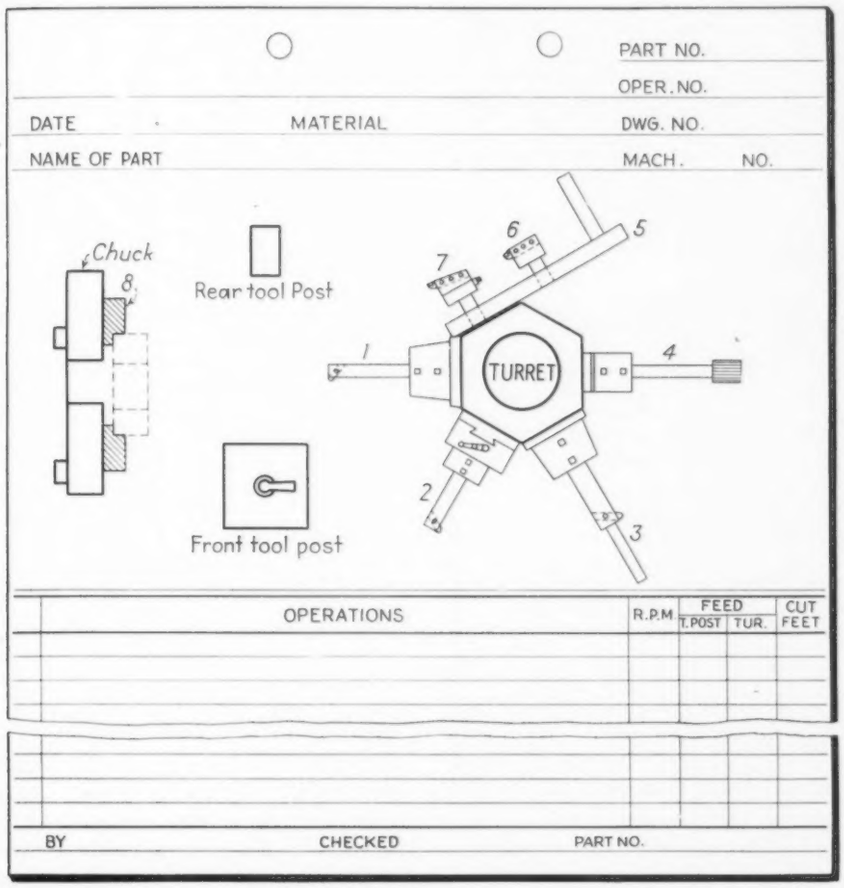


FIG. 6—This shows how the tools in Fig. 5 appear when the finishing lines are filled in.

FOR PC. NO.	OPER. NO.	NAME OF PART	TRAY NO.
A-7434	2	Coupling	

Quantity	Tool No.	Description of Tools in Tray	Location Kept	Drawing
1	TC805-1	Facing tool	05-3	
1	TC806-1	Turning tool	06-3	
1	TC804-1	45 degree chamfer tool	04-3	
1	TC503-1	10 degree turning tool	03-2	
1	TC502-1	Straight turning tool	02-2	
1	TC404-1	Boring tool bit	04-1	
1	7562	Boring Bar	B-99	
1	405	10 degree adj. holder	C-332	
1	420	Straight holder	C-332	
1	19231	Carbide tip core drill 1-11/16	D-276	
1	1.750 "	Reamer	A-256	
		All other tools at the machine		

FIG. 7—This card lists the tools used for the coupling. It is inserted in the envelope shown in Fig. 3.

ment of the parts without smudging the copies.

The layout man will find that tools and tool holders used on some machines, especially turret lathes, will repeat themselves with rather consistent regularity. It is evident therefore that some form of a template will produce quicker results, and will be much more convenient than the use of the straight edge and a combination of angles and protractors.

Fig. 4 shows a template made from No. 20 gage sheet copper. A small brass screw is soldered in the center to act as a handle to lift the template from the drawing and to shift into various positions. This, too, is to avoid smudging of carbon copies. Fig. 5 shows how the template forms the outline of the tools used in the layout. The numbers on the template correspond to the numbers on the tools outlined, just as a matter of convenient reference in this illustration. Fig. 6 shows how the tools appear when finishing lines are filled in. This template has proved to be a great time saver and eliminates the tedious annoyance of manipulating triangles and protractors.

Some may question the feasibility of making layouts in triplicate, offering perhaps the alternative of blueprints. This was tried. Free hand drawings were made of the layouts and then these drawings were sent to the blueprinting department. There was too much delay in the receipt of the blueprints. Jobs would be finished before the time-study department became aware of the new carbide tool set-up. Then too, free hand sketching did not prove any too legibile when blueprinted. If a drawing table is resorted to, then it is more economical and prompt to make carbon copies which entail no additional cost other than the material used.

When a drawing of a layout has been completed by the layout man, he writes in long hand the operations and other data that should appear in the copy matter at the bottom portion of the layout form. This is then given to the typist who types in the operations and tool information as shown. This is done with the three copies of the layouts still intact. In addition to this, a card is typed listing the tools used, as shown on the layout. This card is illustrated in Fig. 7. It is inserted in the envelope containing the layout that goes to the tool crib.

When the tool crib attendant receives the layout, envelope, etc., he removes the card and files it according to the part number in a standard 4x6 in. card file. The envelope containing the layout is then filed in another appropriate file according to part number. These records remain in their respective files until called for by the shop, as explained later.

TOOL REQUISITION

Dept. No. 5	Date 7-1-40
Part No. A-7434	Oper. No. 2
Tools Desired	
As per layout	
Rec'd by J. Jones	Check No. 317
Other Tools Being Returned:-	
As per layout	
Were Used On Part No. A-7434	Oper. No. 1
By G.G.T. Foreman	

FIG. 8—Tool requisition form for presentation to the tool crib attendant.

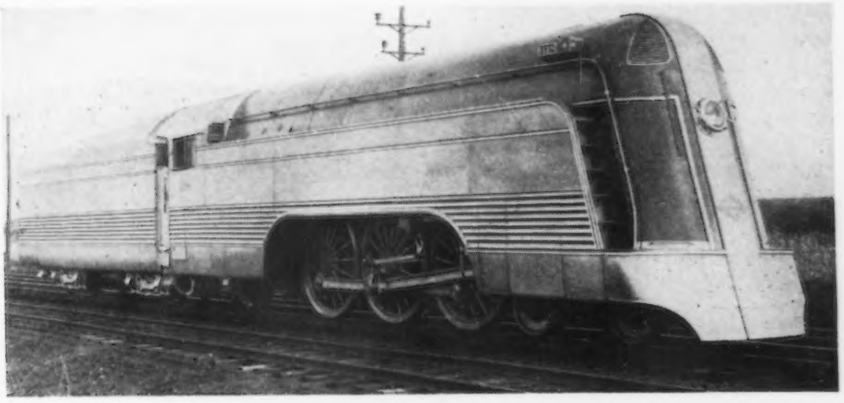
Time Study Procedure

When the time study department receives the third copy of the new carbide tooling layout shown in Fig. 2, it checks the rates and makes notations on the operation cards that the respective operation has been provided with carbide tools. This notation may consist of a star or letter affixed to the operation affected and denotes to the shop that the operation card can be presented to the tool crib for carbide tools assigned to that operation.

In order to prevent the possibility of some mechanics acquiring carbide tools surreptitiously, the card shown in Fig. 7 is necessary. It serves as a double check. When the tool crib attendant receives the *tool requisition* form, Fig. 8, properly filled out by the foreman, he gives the layout to the worker at the window and files the card No. 7 under the number of the machine on which the tools are to be used. This arrangement is better than personal charges through the medium of checks, especially where several shifts of workers are employed. If another worker presented a requisition for the same layout of tools, the tool crib attendant would know by the presence of the card No. 7 under the machine number that one set of tools was out. If, however, the worker is to perform the same operation simultaneously with another worker, the tool crib attendant can issue a duplicate set with a clear knowledge that the tools are not being requisitioned without authority. The requisition ticket is attached to the card No. 7 until it has served its purpose and then can be filed for future reference or destroyed. The use of the ticket as shown in Fig. 8 compels the attention and cooperation of the foreman.

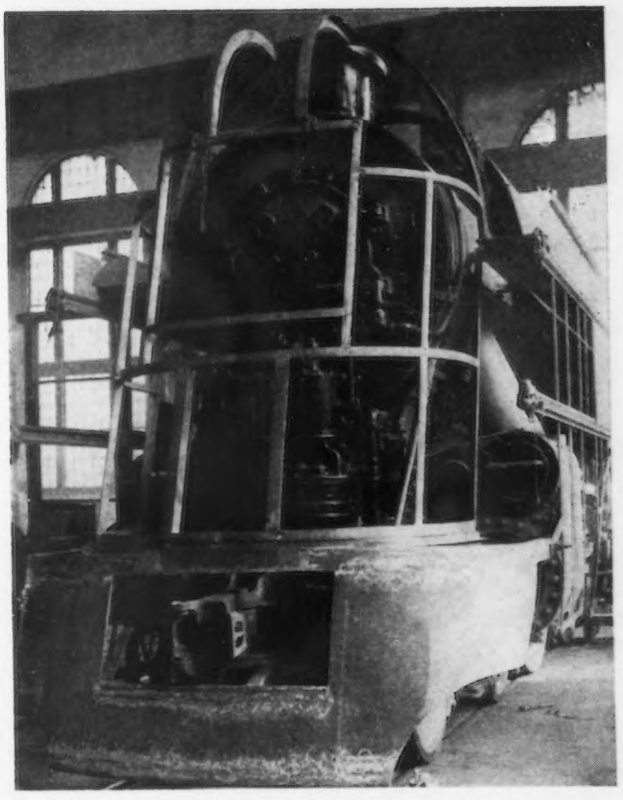
In conclusion, any tools that are broken by a mechanic cannot be returned by him to the tool crib in exchange for another without a written note from the foreman explaining how the tool was damaged or destroyed. The percentage of damage is posted on the note by the man in charge of the carbide tools after which it is turned over to a clerk for calculations in dollars and cents of loss. This amount is then listed under the name of the man who caused the damage. This is only a memo charge in order to keep a record of the tools damaged by each worker. Where the charges are consistently high, steps can be taken to correct the trouble. Here is where foremen can give good service to the efficient operation of carbide tools. They should keep their ears open for tell-tale "singing" of dull carbide tools and their eyes open to the burnish polish that is likely to denote the same condition. Workers, naturally, hate to stop production on piece-rated jobs as long as the tool will "push" the material off. The foreman can stop costs of broken carbide tools considerably by insisting on tool changes.

Dolling-Up the Iron Horse



RIGHT

FRONT end of the engine showing pilot and front hood arc welded framework in place. Photos courtesy of the James F. Lincoln Arc Welding Foundation.

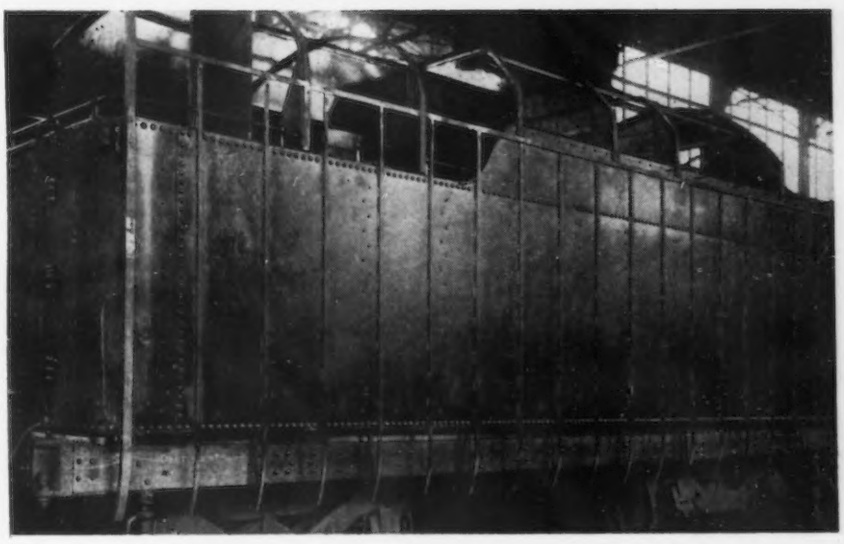


BELOW

FIRST step in sheathing the tender with stainless steel sheets was to arc weld bar steel to the side of the locomotive tender to form the framework shown. This view also shows the top sheet framework welded in place.

RECENTLY the Reading Railroad bought a five-car streamlined, stainless steel passenger train from the Edward G. Budd Mfg. Co. and was faced with the problem of dolling up two conventional 4-6-2 Pacific type coal burning locomotives and their tenders to conform with the appearance of the lightweight cars. How the work was done in the Reading shops is pictured to the right. The 18-8 stainless steel sheets, furnished by the Budd company, were fastened to a framework of angle and bar iron with self-tapping screws. The framework, fabricated by electric arc welding, was bolted and in some instances welded to the locomotive superstructure and to the tender. Without this method of arc welding, the fabrication of the supporting framework would have required a considerably more cumbersome structure and the cost would have been greater. Longer service life is expected to result from the rigidity of structure effected.

The framework for the rear canopy of the tender is entirely electric arc welded of light weight steel I-beams and angles. It has four hooks fitting into four receptacles mounted on the rear of the tender to permit the removal of the canopy at will. This canopy makes it possible to attach the tender to either end of the five-car train without turning the train around, as the end cars of this train are designed to run in either direction.



Fatigue Failure

By GEORGE SACHS
Case School of Applied Science, Cleveland

DATA on the effects of stress raisers on the fatigue strength of metals and alloys are particularly important these days with so many service parts highly stressed. In the first part of this correlated abstract last week the author presented data on the fatigue strength of notched specimens, and the effect of corrosion on fatigue strength. Herein, in conclusion, information is given on chafing fatigue, and the effect of surface working on the fatigue strength in the presence of stress raisers.

CHAFING FATIGUE: Sliding between the surfaces of two metals that are pressed together with a certain force is usually associated with wear, particularly of the softer metal. Small particles are removed from the metal surface and transformed to oxide if the sliding action takes place in common atmosphere[26]. A similar process occurs between two closely fitting machine components, when subjected to vibrations; and this "chafing" or "fretting" has long been a source of considerable trouble.

The fitting surfaces become pitted in irregular patches and usually some dark powder is to be seen. This process differs from ordinary wear by the fact that it occurs at contact surfaces which are supposed to be fixed in relation to each other, such as forced fits and shrink fits. It has been found, however, that in any such system relative movements between the surfaces occur if the vibrations exceed a certain limit, while below this limit all strains in this compound system are purely elastic[27].

Similar relative movements have also been observed in rolling friction. The tangential force which has to be transferred, for example, from the wheels to the rails of a locomotive, strains the particles of the surfaces in contact, first elastically, then plastically and finally causing rupture[28]. The force required to break off these particles or wear the metal is the sliding friction.

While the effects of different notch shapes and corrosion agents on the fatigue strength have been extensively studied, only a few investigations have been carried out up to the present time on chafing fatigue. The fatigue strength of steels[2,8,15,29], aluminum alloys,[29,30] and magnesium alloys[16,23] is considerably reduced by any chafing action, such as present in press fits, bearings, hubs or jaws (See Fig. 7).

It has been furthermore shown that rotating bending tests with cylindrical specimens yield results corresponding to those obtained with other types of chafing.

The testing of cylindrical bars[3,29] offers therefore, a simple procedure for determining chafing fatigue strength values. Besides, chafing appears to exert a similar effect as a particularly sharp notch and thus yields a desired

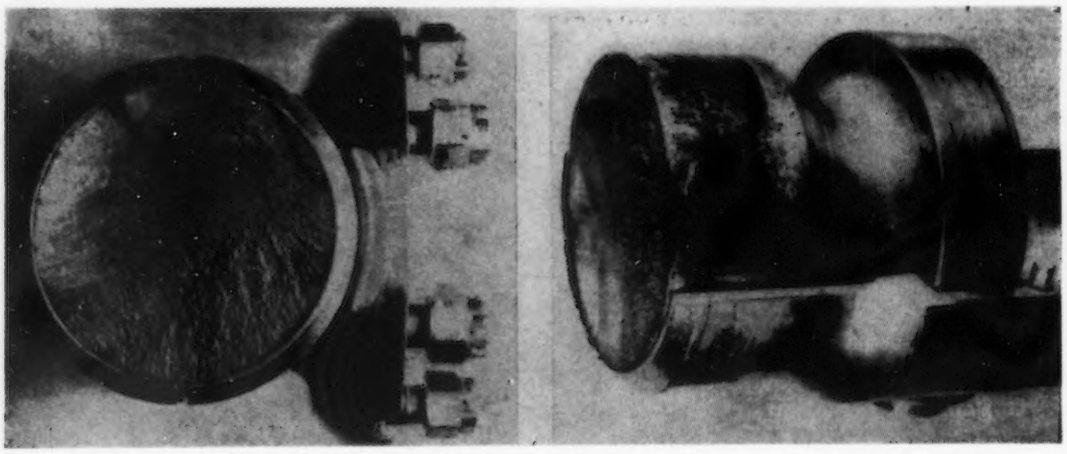
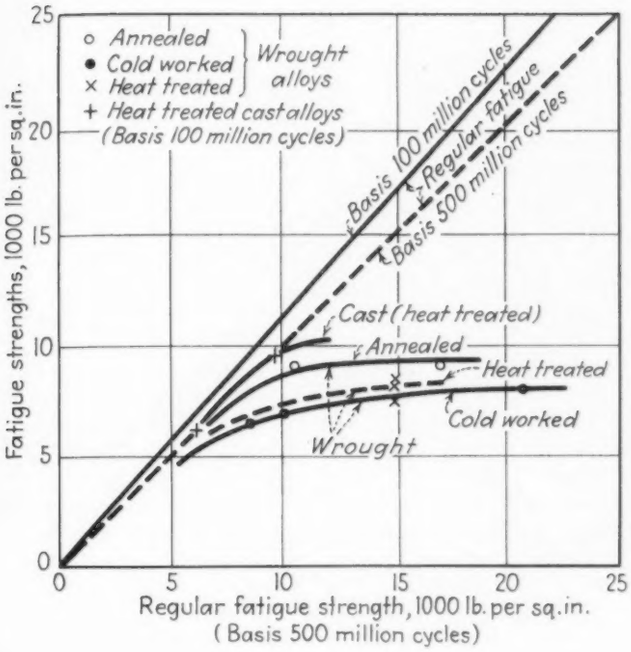


FIG. 7—Fatigue break and chafing of a magnesium alloy aircraft propeller.



limiting condition (See Fig. 1 last week.) If the relation between notch fatigue strength and chafing fatigue strength should be more definitely established, such fatigue tests on cylindrical specimens may also replace the fatigue testing of notched specimens which are difficult to produce uniformly.

Thus, again, no benefit is derived from alloying, cold work and heat treating if a strong chafing action is present[29]. It has been found, on the contrary, that the chafing fatigue strength of an annealed metal may be considerably higher than that of the same metal in the cold worked or in the heat treated condition, as illustrated in Fig. 8 for some aluminum alloys. Cast alloys are usually superior to wrought alloys regarding the chafing fatigue strength (Fig. 9). It appears that the loss in fatigue strength due to chafing again increases with the tensile strength (See Fig. 1) or regular fatigue strength (See Fig. 8) of the particular alloy within a certain alloy group. However, the level which is approached by the high strength alloys is different for the various conditions. In the group of wrought aluminum alloys (See Fig. 8) the highest chafing fatigue strength values are obtained with annealed, and still higher values with cast, heat treated alloys, while cold worked and wrought heat treated alloys have chafing fatigue strength values that are about 20 to 30 per cent lower.

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FIG. 8—The relation between the chafing fatigue strength and the regular fatigue strength for various aluminum alloys.

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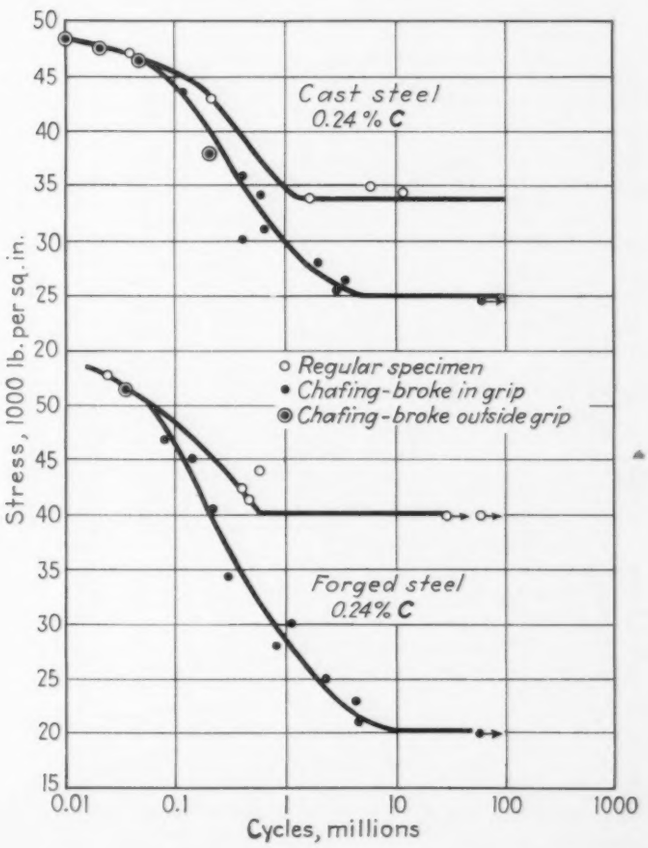

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FIG. 9 — Stress-cycle diagrams of normalized cast and wrought mild steels in regular and in chafing fatigue.

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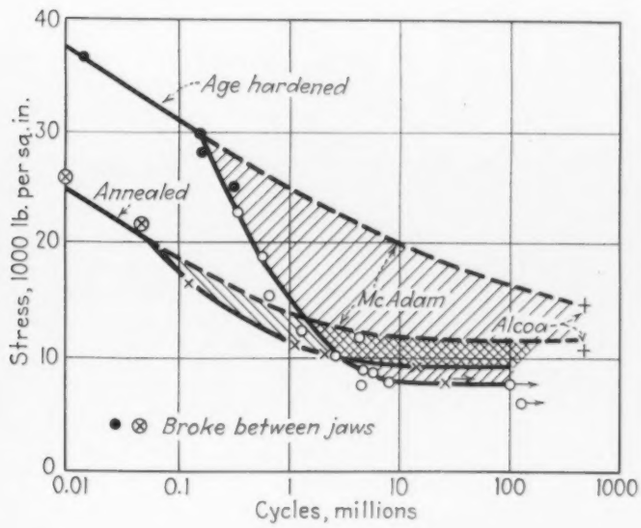

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FIG. 10 — Relation of regular fatigue strength to chafing fatigue strength for annealed and cold worked duralumin.

——chafing
- - - -regular

° ° °

Alloys with a regular fatigue strength below a certain limit (depending upon the condition) are little affected by chafing (See Fig. 8). Their regular and chafing fatigue strengths are almost identical; and cylindrical specimens, therefore, generally break outside of the section which is subjected to the stress raising action. These limits, however, are rather low, and such a behavior has therefore, only been observed in the pure metals and in the case of low strength alloys.

The chafing action, however, is reduced in any alloy to zero, if the stress

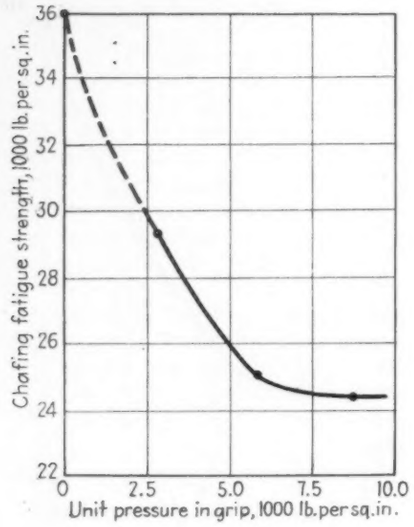

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FIG. 11—Effect of grip pressure on the fatigue strength of cylindrical, cantilever type specimens. (Thum and Wunderlich).

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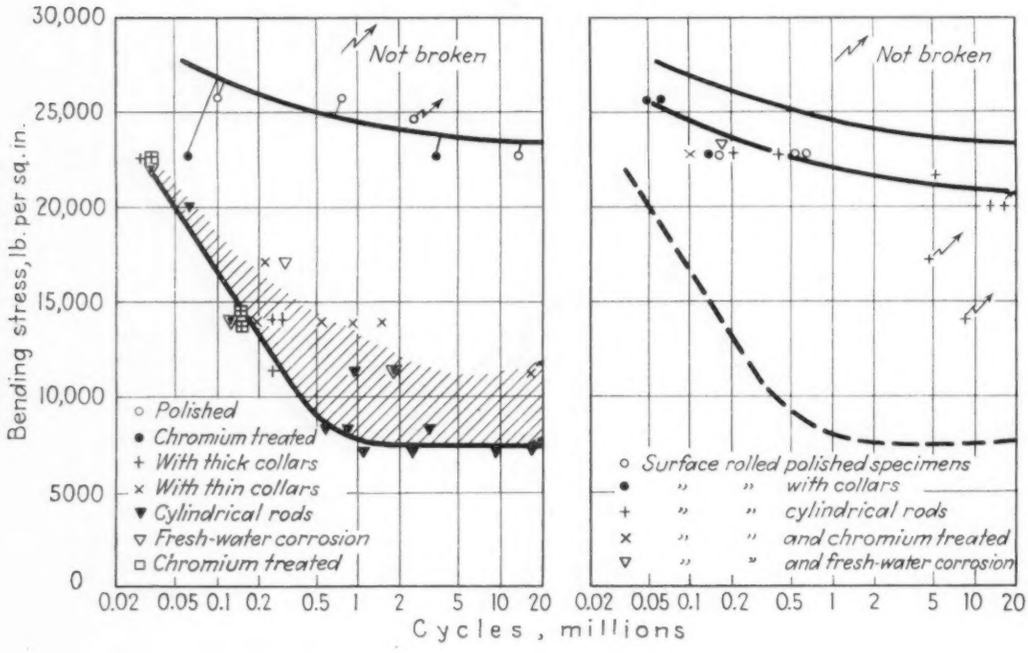
etc. on the gripped section (See Fig. 11). Surface films of a metallic or nonmetallic nature have no beneficial effect on the chafing fatigue strength, while they reduce the wear and formation of the oxidized powder at the area of contact. However, a thick intermediate layer of a yielding fabric[9,16,23] has been found to produce an increase of the chafing fatigue strength (See Fig. 14).

Effect of Surface Working

The damaging effect of stress raisers can be reduced by certain mechanical surface treatments. It has been previously observed that the decrease in fatigue strength will vary appreciably for threaded parts, depending upon the method of manufacturing[8]. The reason for these variations has not yet been explained, but according to some experiments the deformations and residual stresses produced by cutting[32] differ materially with the machining conditions.

Actual plastic deformation of the surface layers considerably improves the fatigue strength in cases where it is reduced by the presence of notches, grooves, surface defects, corrosion and similar attack. A machined thread of a screw generally has a much lower fatigue strength than a rolled one,[25] and the same advantage applies for a thread machined oversize and finished by rolling. However, a subse-



is sufficiently high (See Figs. 9 and 10). The branches of the stress-cycle diagrams at high stresses are usually identical for the regular and the chafing fatigue; they separate at a certain stress, depending upon the nature of the metal and its condition, and gradually spread apart towards low stresses.

A similar behavior has to be expected for the notch and the corrosion fatigue curves, as both do not practically affect the tensile strength (representing the stress for a number of cycles = 1). The infrequent results published for low strength alloys also indicate that their fatigue strength may not be reduced by either notches or corrosion, as previously discussed.

The extent of the reduction by chafing increases with the pressure[8] which is exerted by the press fit, bearing,

ABOVE

FIG. 12—The effect of various stress raisers on the chafing and corrosion types and the effect of surface rolling on the fatigue characteristics of a magnesium propeller alloy.

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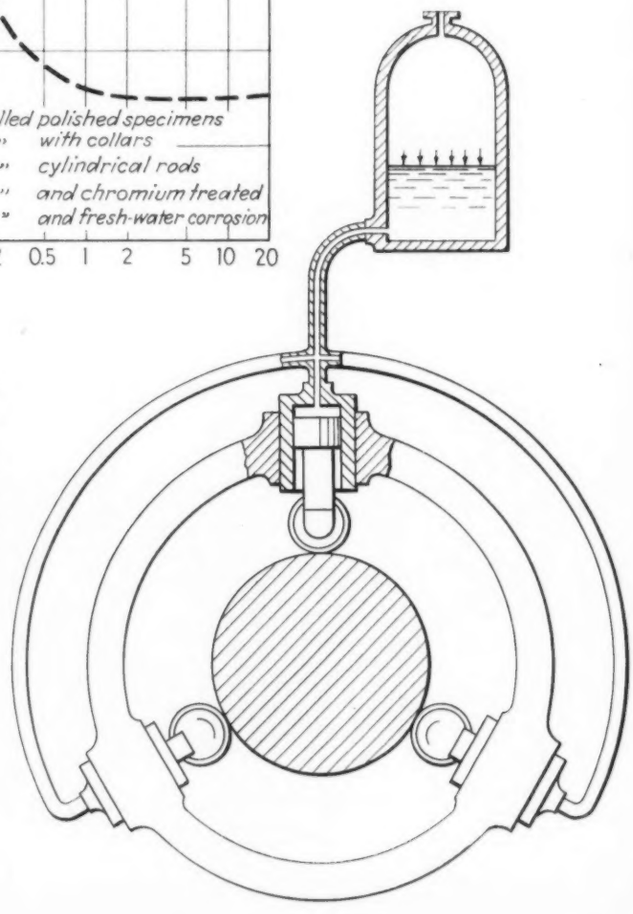
FIG. 13—Device for surface rolling.



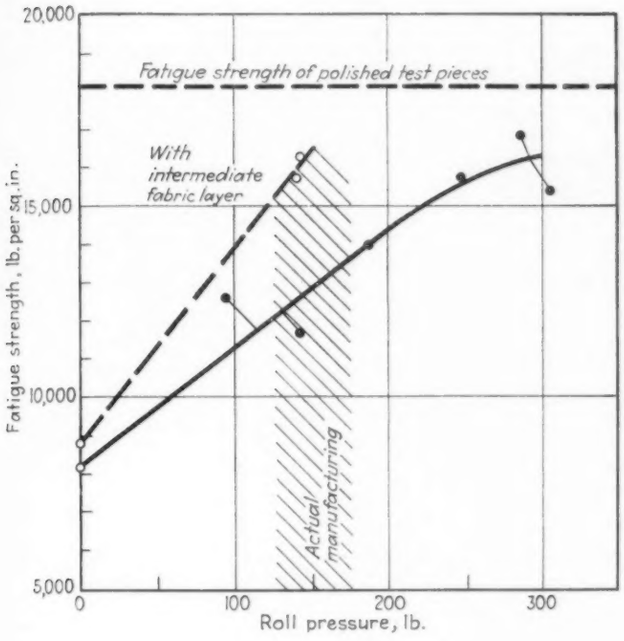


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FIG. 14 — The effects of surface rolling with different pressures and of an intermediate fabric layer on the fatigue strength of 2¾ in. diameter magnesium alloy rods.

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quent heat treatment eliminates these improvements from rolling.

A similar beneficial effect can be obtained on many machined parts by locally deforming the critical surface region subjected to fatigue by some mechanical treatment. Such a surface working, however, does not materially increase the fatigue strength of a polished cylindrical part,[28,34] at least not to a degree that is obtained for the surface working of notched parts or parts subjected to corrosion or chafing fatigue.

It has been found, for example, that the fatigue resistance of parts with transverse bores[35] and keyways[36] can be appreciably increased by plastically deforming the metal in the vicinity of these grooves with special tools.

The same beneficial improvement is obtained in cylindrical parts which are subjected simultaneously to fatigue and a corrosion attack by still water and salt water (See Fig. 12). By treating the surface with one or several rolls, which produce a close spiral indentation, the corrosion fatigue strength can be increased approximately to the value of the polished material[37]. This "surface rolling" of cylindrical parts in commercial practice can be accomplished on a large lathe equipped with a special rolling device. Such a tool can be made up of a steady rest with hydraulic regulation of the pressure (See Fig. 13). The rolling conditions[23, 24] such as the shape of the rolls, the pressure and the rate of advance have to be adjusted to obtain the maximum benefit (See Fig. 14).

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FIG. 15—Residual stresses developed in a magnesium alloy rod by surface rolling.

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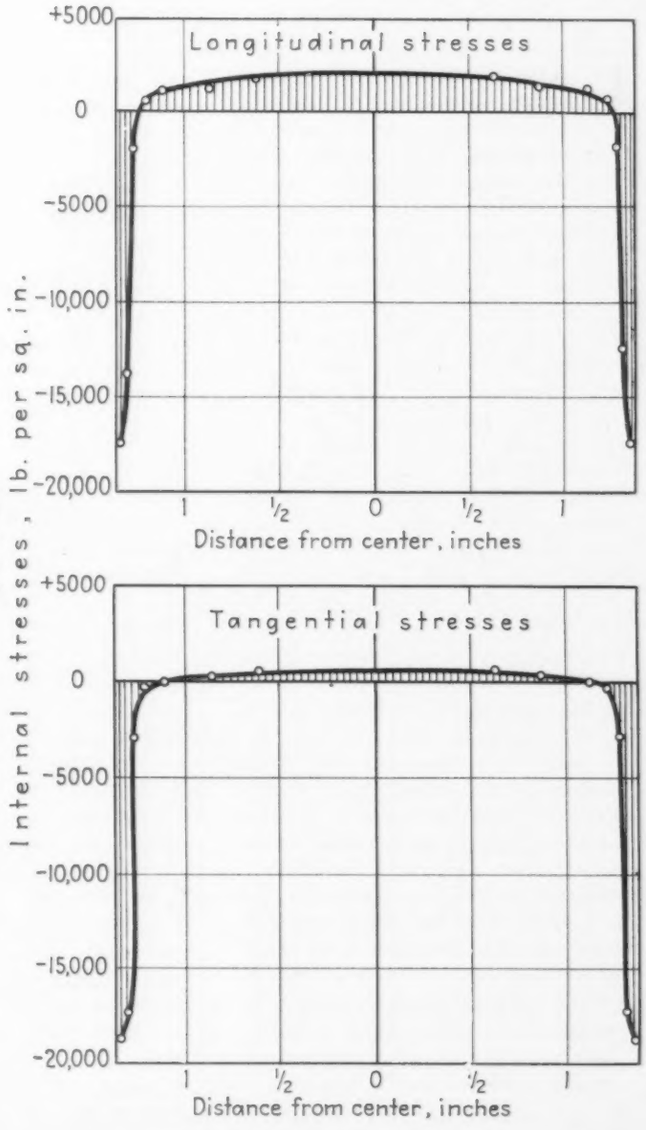
Surface rolling also will considerably improve the chafing fatigue limit[3]. Thus, surface rolled axles[15] and magnesium propellers[23] are used commercially to a certain extent.

"Cloudburst" surface hardening or "shotblasting" is another surface treatment which produces local cold working, while sandblasting is essentially a grinding process. It has also been claimed that the former processes have a beneficial influence on the fatigue strength[38].

The factor or factors associated with localized surface deformations which cause the improvement of the fatigue properties is not yet quite apparent. There may be a certain improvement in the properties of the surface layers by the cold deformation[15]. A more convincing theory considers the main factor to be an accumulation of high compression stresses[23, 39] in the surface layers (See Fig. 15) which render the metal more resistant to the



effects of stress raisers on fatigue. The residual stresses in steel springs created by over-loading or "scragging" also generally improve their low fatigue strength[40]. However, the effect of residual stresses introduced by general cold work or quenching has been found to be rather small[29].

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Cutting Steel with Carbides on Older Machines

By JAMES R. LONGWELL

Chief Engineer, Carboloy Co., Inc.

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IN spite of the rapidly spreading adoption of cemented carbide tools for machining of steels to increase productive capacity of machine tools, considerable misapprehension apparently still exists as to the usability of older types of machine tools. There is no reason why older machines in good condition—such as turret lathes and boring mills—cannot be readily adapted to the use of carbide tooling provided the machine is able to run fast enough—and smoothly enough at that faster speed. In cutting steels with carbides the main objective to be kept in mind is that cutting speed should be high enough to prevent forming of a "built-up" edge. This means an average cutting speed in the neighborhood of 200 ft. per min. (The lower the carbon usually, the higher the speed.)

To check the adaptability of any piece of available equipment to the use of carbides, the following general considerations suffice:

POWER REQUIREMENTS: It takes more power to run at the higher speeds required—to remove metal at a faster rate. It takes more power, also, to cut steel than non-ferrous metals or cast iron. Therefore, the machine horsepower must be checked. Horsepower requirements may readily be calculated by the following formula:

> Hp. per tool = Depth of cut in inches × Feed in inches × Surface speed in feet per min × Power constant.

The power constant varies from 6 to 10, depending on the steel to be cut, as follows:

SAE Classification	Power Constant	SAE Classification	Power Constant
1010-1025	6	3115-3130	8
1030-1095	8	3135-3450	9
1112-1120	6	4130-4820	9
X1314-X1340	8	5120-52100	10
T1330-T1350	9	6115-6195	10
2015-2520	7	Cast Steel	9
2330-2350	9		

The power required to operate the machine idle must be added, of course, to obtain motor horsepower. This requirement is usually figured as 30 per cent of the horsepower required for cutting.

POWER TRANSMISSION: With the power requirements for increased machine speed to take full advantage of carbide tooling determined, it is necessary to check belts, clutches, etc., for ability to transmit the horsepower to the spindle. Clutch fingers should be adjusted to prevent slipping and stalling. Where machine is equipped with a flat belt, it is sometimes desirable to change to a V-belt drive.

CENTERS: The increased rate of stock removal at high speeds with cemented carbides makes it advisable to use an anti-friction tail stock center.

SPINDLES: Spindles should be checked for adequate lubrication at the higher speeds at which they will operate.

TOOL POSTS AND HOLDERS: Rocker tool plates should be eliminated and a solid support provided. A set of shims should also be provided to maintain the tool at proper cutting height.

CHIP ROOM: Provision must be available to handle the increased volume of chip production. Sheet metal chutes frequently prove helpful in eliminating pockets and slots where chips are apt to clog. Chip breakers can be used where size of openings demand production of small chips.

BACK LASH: Before cutting steel with cemented carbide tools, machines should be checked for excessive clearances which would cause chatter at the higher cutting speeds. Worn bearings, slides, and ways should be corrected. Where it is found impossible or impractical to tighten the machine up sufficiently to eliminate all vibration, a certain amount of chatter can be corrected by the incorporation of negative rakes in the tools.

With these simple considerations, there is no reason why any machine cannot be used effectively for cutting steels with carbides, particularly where a single point cutting tool is to be used. If the machine is capable of handling the horsepower required at the higher speed and can be tightened up sufficiently to eliminate back-lash and chatter, no trouble should be encountered in greatly increasing productivity per machine with cemented carbide tooling.

Semi-Permanent Molds

SMALL foundries can materially increase production of suitably designed castings such as bushes, large washers and nuts, handwheels, brackets, small propellers, etc., by the use of semi-permanent molds, according to a recent article by F. Hudson in *Foundry Trade Journal*. The best results are obtained on the more simple bronze, gunmetal and brass castings, free from intricate cores, normally made in two-part boxes. Foundries lacking machine molding facilities and short of skilled labor derive particular advantage from this method of production.

In order to obtain maximum casting solidity and to reduce the need of feeding risers as much as possible, the mold should have a high thermal conductivity and this can be obtained by the use of a silicon-carbide or graphite base material. Furthermore, in order to obtain the highest yield of castings from the mold it is important that the method of running should be such as to enable it to be readily removed from the mold. Similarly, a good taper should be given to parallel faces of any appreciable depth.

Fig. 1 shows a suggested method of making a simple mold for a gunmetal disk. That part of the mold forming the center hole should be well sprigged and given good taper. It should be noted that molding boxes are not required, and the semi-permanent mold can be initially rammed up in a wooden frame which is subsequently removed. Locating pins and sockets can be inserted during ramming up. The mold should be well vented by wire right through to the casting face and air vents should also be made on the joint as shown as an additional precaution.

Fig. 2 shows the method of making a mold for a motor boat propeller. In this instance the casting is poured horizontally through a large runner-head on the center boss, and to facilitate removal of the top part an oil-sand insert is fitted prior to each pour so that the necessary clearance can be obtained after casting. Alternatively a weak red-sand core can be employed sufficiently friable to enable the runner-head to be drawn through the top part. It is important to note that the head should only be filled with metal to within ½ in. of the top.

A suggested mixture for semi-permanent molds is 97 per cent dry silicon-carbide sand (fire sand) and 3 per cent concentrated sodium silicate. The sodium silicate is diluted with an equal part of cold water before adding to the silicon-carbide and is mixed rapidly to the consistency of green sand. If the mixture appears to be too dry, temper accordingly. Use immediately—if drying out takes place, the final strength of the mold is markedly reduced. This mixture possesses enough green bond strength for most of the molding operations entailed. Greater plasticity can be obtained by the addition of up to 2 per cent bentonite, but the presence of clay decreases the thermal conductivity and the strength after drying and should therefore be avoided as far as possible. Should the addition of clay be found necessary, the percentage of sodium silicate will probably have to be increased in order to get adequate dried strength. Additional sodium silicate can also be employed to increase the strength of clay-free material if this is required.

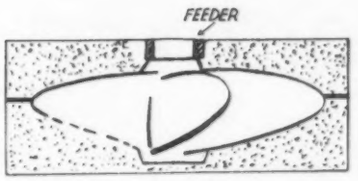

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Fig. 1—Simple mold for gunmetal disk.

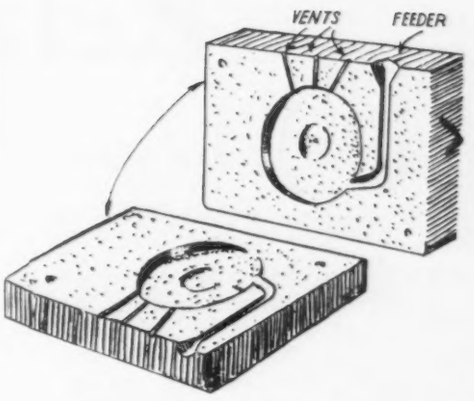

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Fig. 2—Method of making mold for motor boat propeller.

Molds are rammed up in the normal manner. In certain instances, such as in propeller production, it will be found most convenient to make the bottom-half first, and then to dry it. The pattern is replaced and the top part rammed up. The whole assembly should then be turned over and pattern removed, leaving the other half ready for drying. This enables the mixture to be satisfactorily handled without requiring much green bond strength with the consequent production of the strongest structure after drying. Moreover, it results in obtaining two perfectly contiguous faces at the mold joint. Before drying, all molds should be well pricked with a vent wire right through to the pattern face in order to get maximum permeability. The refractory wash used in casting production subsequently seals up any small vents at the casting face. The use of moisture resisting parting powder on the pattern and mold faces is recommended, especially when wooden patterns are employed.

Molds bonded with sodium silicate should be dried slowly at first, otherwise swelling and blistering are likely to occur. It is accordingly advisable to keep the oven temperature just below 100 deg. C. for the initial drying period and until most of the moisture has been removed. Subsequent temperatures can be increased to the maximum possible.

The surface of semi-permanent molds made from silicon-carbide mixture is inclined to be rough, and the required degree of casting finish is obtained by treating the mold with a suitable surface dressing. The consistency of the applied wash should be such as to fill up the small cavities present. A suitable wash for this purpose can be obtained from plumbago or graphite made into a cream with water containing 5 per cent sodium silicate. Care should be taken when applying the first dressing as there may be a tendency for the mold surface to soften and rub if the drying temperature has not been sufficiently high. Once the first casting has been obtained from the mold, no further danger is likely to arise from this cause. The mold surface should be redressed when necessary. Washes containing clay are not advised for semi-permanent mold work, although cereal or oil binders can if necessary replace the sodium silicate mentioned above.

Old molds can be crushed or broken down for re-bonding with sodium silicate or used for packing or filling up space behind the mold face.

Refractory Radiant

By W. F. ROSS
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THE successful application of vitreous enamel to steel may be said to be dependent upon three major factors: The frit or enamel, the kind and surface condition of the steel, and the means by which radiant heating is applied for fusion.

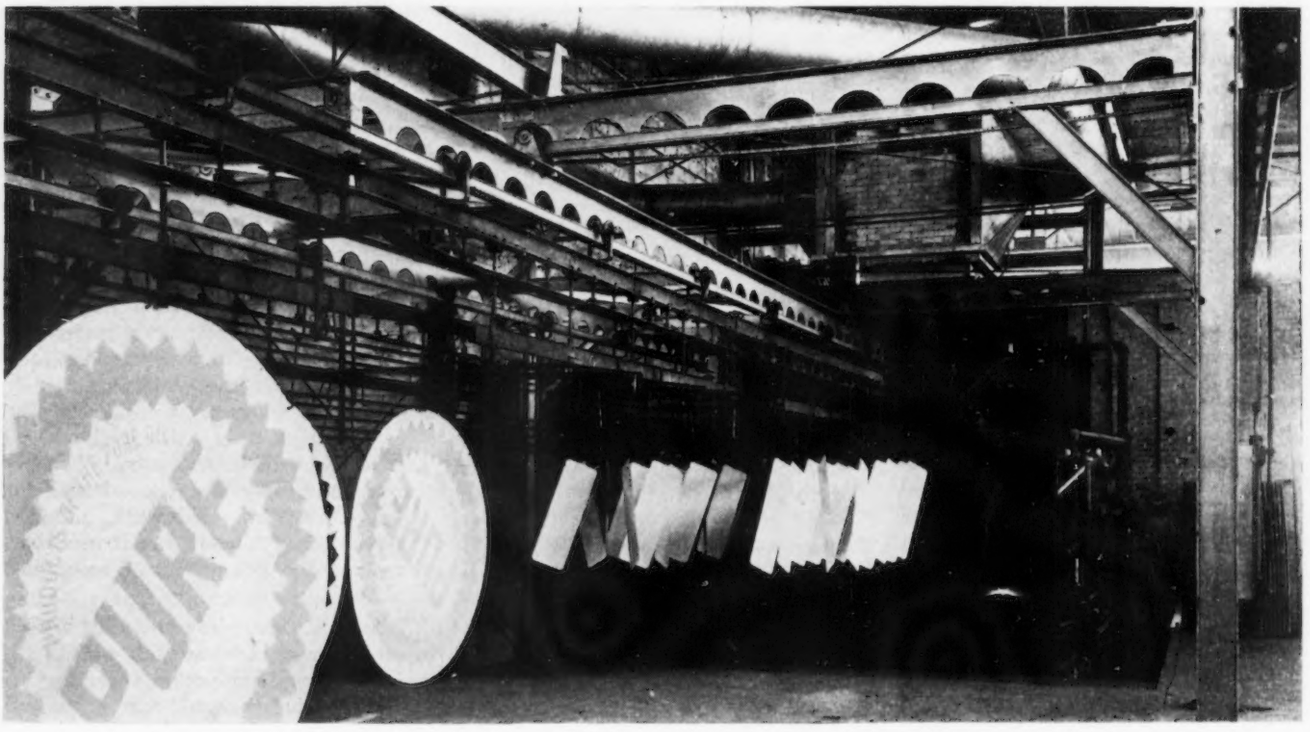
The first two factors are largely controlled in the purchase of suitable oxides and steel sheets from suppliers who are well acquainted with the rigorous demands of the enameling industry. The third factor, however, is a function of the furnace equipment used for vitreous enameling, together with the method of handling materials under high temperature conditions.

It is generally conceded that direct radiant heat is required for the fusion of the vitreous material used in enamel. Careful consideration of the means or method of heat application to secure the best enameling results is therefore required.

Since a large portion of all enameled parts is now being hung from overhead conveyors in continuous or semi-continuous enameling furnace equipments, the problem of securing uniformity of temperature throughout the conducting refractories over the entire area exposed to the ware being enameled is of primary importance. The quality of the finish, or the perfection of the adhesion of ground coat to steel depends not only upon the means of heating but to a large degree upon the uniformity and intensity of the heat.

Recent enameling furnace installations have achieved rapid and uniform heat flow to the ware being enameled by the application of a series of vertical refractory tubes. This is particularly true in furnace equipments utilized for the enameling of sheets hung in double relationship or pairs, where uniformity of heat to both pieces must be assured.

FRONT view of the refractory radiant tube enameling furnace, showing details of bridge carrying ware both before and after firing. This view also shows the method of using cross arms for handling small pieces, as well as hook arrangement for handling larger pieces of ware without the use of cross-over arms.



Tubes . . .

—Fuel fired furnace with recuperator type heat exchanger and silicon carbide radiant tubes used for enameling flat ware, pressed and drawn shapes, etc.

An interesting installation of special design has recently been placed in service at the new plant of the Porcelain Metal Products Co., Pittsburgh, for the enameling of large flat sheets and similar pieces. The accompanying photographs show the appearance and operation of equipment.

Designed for enameling miscellaneous flat steel shapes, such as large advertising signs, the equipment is equally suitable for use with pressed or drawn steel shapes suitable for suspension on hooks or supported on suspended burning tools. Sufficient burner capacity is provided for an hourly gross production of approximately 4500 lb. of material, enamel and burning tools, with an operating temperature of approximately 1650 deg. F.

The fusion chamber proper provides an unrestricted cross-sectional loading area 5 ft. 1 in. wide by 7 ft. high, measured at the door. The actual chamber width is 6 ft. 7 in. with an effective chamber length of 12 ft. 4½ in. measured from the inside of the 18 in. long charging throat to the rear wall.

The furnace arch is of the interlocking suspended type provided with a slot along the center line of the furnace.

Muffle effect within the fusion chamber is provided by means of firing beneath the flat tongue-and-groove type silicon carbide working hearth, and exhausting the products of combustion through vertical silicon carbide radiant tubes spaced on approximately 9-in. centers along each side of the chamber. Each tube is sealed to an individual bottom support block containing a duct, and terminates in a rectangular section flue at the top of the chamber, which flue leads directly to a stack, or in this case, to a heat interchanger of the recuperator type, by means of which waste heat in the flue gases may be reclaimed for the purpose of supplying heated air to drying booth or to the plant heating system. One such flue accommodates the tubes along each of the sides of the furnace.

The firing chamber beneath the working hearth is provided with spaced support piers, between which the various burners are fired. Temperature control is in two zones arranged for modulated or proportioned supply of gas and air to the burners in accordance with the thermal requirements in each zone.

The open end of the furnace is provided with hydraulically operated split type doors arranged for horizontal opening to any predetermined width up to the maximum of 5 ft. 1 in. Unlike a vertically opening door, the split type arrangement may be opened just sufficiently to allow the charging or discharging of material into the chamber with resultant economy due to lessened heat loss during the open interval.

As designed, the furnace equipment is readily adaptable to fork charging. However, a series of trolley conveyors, together with a movable charging bridge, have been installed in this instance to facilitate the handling of material into and from the fusion chamber.

Each trolley is arranged for operation upon a monorail, which when in position before the furnace chamber allows the trolley and load to be moved forward over a stationary rail located over the slot in the furnace arch.

Closure of the slot in the arch is accomplished by means of a series of overlapping seal plates, which are self-adjustable upon vertical rods attached to each trolley. These seal plates move with the trolley, and when the trolley is upon the stationary monorail over the furnace chamber rest upon slide castings at either side of the arch slot.

Closure of the slot when no trolley is over the furnace is accomplished by means of a set of plates which automatically slide into position over the slot as the trolley is withdrawn from the chamber.

A portion of the seal plate retaining rods extends downward through the slot and into the furnace chamber, where each rod is provided with a hood end. These rod extensions form the suspension members for pieces or burning tools within the fusion chamber.

The features of rapid and facilitated handling of materials into and from the fusion chamber are provided by means of a transverse stationary bridge in front of the furnace, which carries a movable crane equipped with two monorails, either of which may be moved into position for charging or

discharging a trolley of material into or from the fusion chamber.

The transverse travel of the crane, together with the movement of trolleys from the crane to the furnace and vice versa, is hydraulically operated under direct control by the furnace operator.

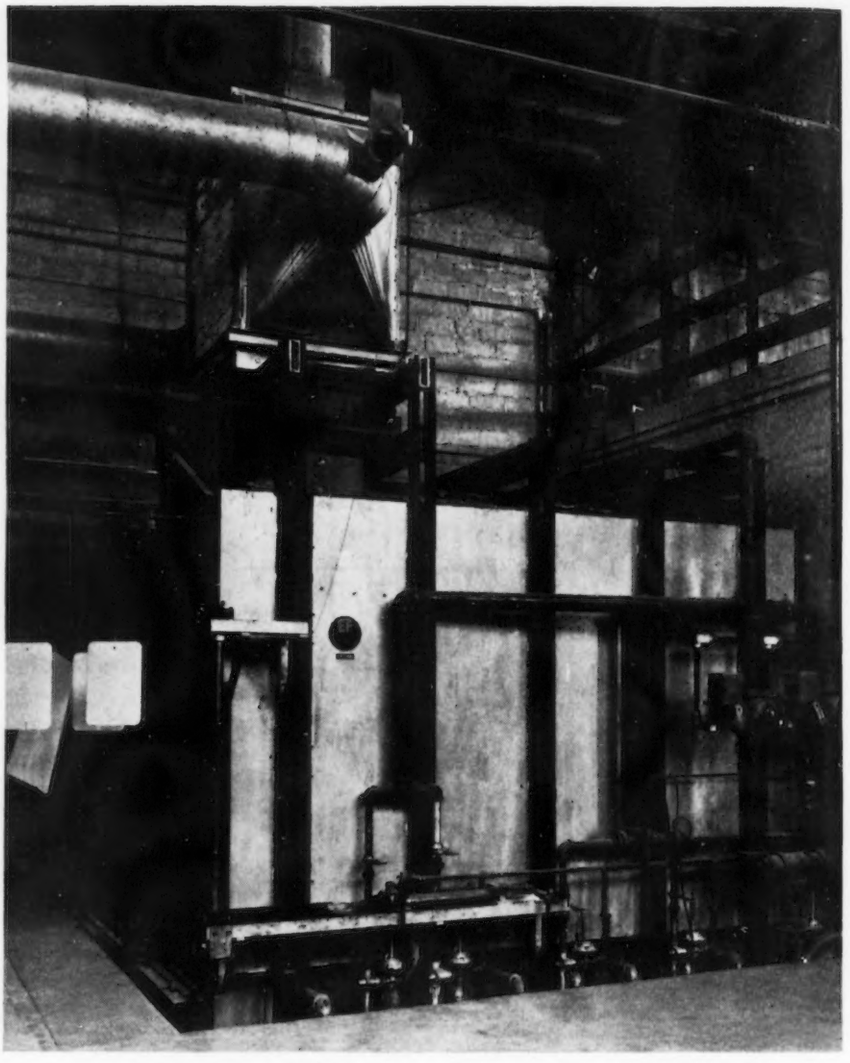
Additional stationary rails at the outer side of bridge and crane provide suitable cooling stations, loading positions or trolley storage space.

Essentially a fuel fired furnace, the equipment may be designed for use with natural or manufactured gas or with oil. The operation of the equipment and the capacity remain the same with any of these fuels.

The handling system as described is only one of many possible applications of batch type means of handling material suitable to the fusion chamber. Similar type equipments of the double-ended variety are also utilized for continuous enameling, using an endless chain conveyor operating upon a monorail, with suitable entrance and exit vestibules in place of doors.

Among other features, it is to be noted that the use of radiant heating tubes provides the full utilization of the bottom and side wall areas as a source of radiant heat. Comparatively rapid flow of heat to the work within the fusion chamber is provided by the increased conducting and radiating surface as well as the highly conductive silicon carbide construction of the tubes and hearth, with resultant high fuel efficiency, lower combustion chamber temperature and increased furnace materials life.

The design and construction of the silicon carbide tubes permit the removal of all stress and mechanical strain on the refractories, as the tubes are carried in floating relationship to the arch and side walls, thus insuring freedom from breakage, warpage and the resultant leakage of the products of combustion into the firing chamber.



SIDE view of refractory radiant tube enameling furnace, showing door operating mechanism, arrangement of burners, controls and fans for combustion air. This view also shows the loading trolley and method of hanging ware and also the recuperator mounted above for reclaiming heat from flue gases.

Design provides for removal of one or more tubes for replacement or repairs without disturbing any others, or causing costly shut downs for resetting of muffles.

The optional use of recuperators as supplied with this equipment makes possible the inexpensive supplying of relative large volumes of preheated air, which may be utilized in drying booths or in the plant heating system. The air thus heated is, of course, entirely free of any of the waste products of combustion.

Quenching and Quenching Media

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HERE is an article that sets forth in understandable language the how, why and what of quenching of steels. Every day more and more steels are being heat treated, and for that reason the data herein are particularly timely. Particularly valuable is the method described for quenching manganese oil hardening steels to avoid breakage. A similar plan is also advocated for hardening high speed steels. Other features covered are the effects of cooling rates, critical cooling rates, and dimensional changes during heat treatment.

QUENCHING is defined in the A.S.M. handbook as "the rapid cooling by immersion in liquids, or gasses, or by contact with metal, from a high temperature in order to alter or preserve certain desirable properties."

The effect of the quenching medium on the properties of the material quenched depends, insofar as the quenching medium is concerned only on the *rate of cooling so provided*. The elaborate claims of certain proprietary solutions or local waters *is not due to any unique property they possess other than any effect they may have on the cooling rate*.

In most quenching operations hardening is the object, and this implies the formation of martensite. Whether or not this is accomplished depends not only on the cooling rate of the quenching media, but on the composition of the steel and its critical cooling rate. In practice, however, as the ratio of surface area to volume is reduced, quenching becomes more a function of the rate of heat transfer from the interior to the surface. Thus, in large sections if rapid cooling is necessary to induce hardening, it becomes impossible to cool the center rapidly enough for full hardening. This is known as the mass effect.

First, it should be of interest to consider the quenching bath itself. A liquid is selected as a quenching medium on the basis of its ability to absorb heat from the steel at or in excess of a desired rate. This ability depends on the specific heat of the liquid, on its thermal conductivity and viscosity. The volatility of the liquid may be of importance because it is an index of the temperature at which a vapor envelope may form around the piece being quenched, and interfere with the flow of heat from the metal into the liquid.

By taking cooling curves on a small specimen during quenching, Pilling and Lynch[1] determined how the surface cooling power of the liquid changed with the surface temperature of the piece. They found cooling to take place in three stages: (I) *Vapor blanket cooling*, in which a thin vapor film surrounds the hot metal. Cooling is by conduction and radiation through the vapor film and is relatively slow. (II) *Vapor transport cooling* — this follows stage (I) and its onset is marked by wetting of the metal surface. Vapor forms copiously in bubbles and is carried away by gravity and convection currents to condense in the cooler surrounding liquid. This is the fastest stage of the cooling. (III) *Liquid cooling*—this follows the (II) stage as the surface temperature of the metal approaches the boiling point of the quenching liquid. Vapor no longer forms, so cooling is by conduction and convection only.

In aqueous solutions the (I) stage is of most concern as cooling is slow; and if it persists for more than a few seconds transformation will occur directly to pearlite at a high temperature and soft spots will result. To avoid this, the vapor blanket stage must be limited and as the duration of this stage increases rapidly with temperature the first rule in water quenching is KEEP WATER BASE QUENCHING LIQUIDS COLD—that is in the neighborhood of 70 deg. F. In the case of oil hardening steels it has been noted that their transformations take place at very low temperatures, and particularly if high in carbon are liable to cracking. This can be prevented to a great extent by raising the temperature of the oil—this also tends to speed up the initial stages of quenching due to lower viscosity. Thus rule No. 2 is to KEEP QUENCHING OILS WARM, preferably between 90 deg. and 140 deg. F.

Table I shows approximate cooling velocities at the center of ½ in. round test bars in various media.

Water is the most widely used coolant (it is very effective if used in the form of a spray), but there is the serious objection that its cooling rate changes rapidly with temperature. Water is not to be recommended as a good

[1] "Cooling Properties of Quenching Liquids." Transactions A.I.M.E. 1920, v. 62, p. 665.

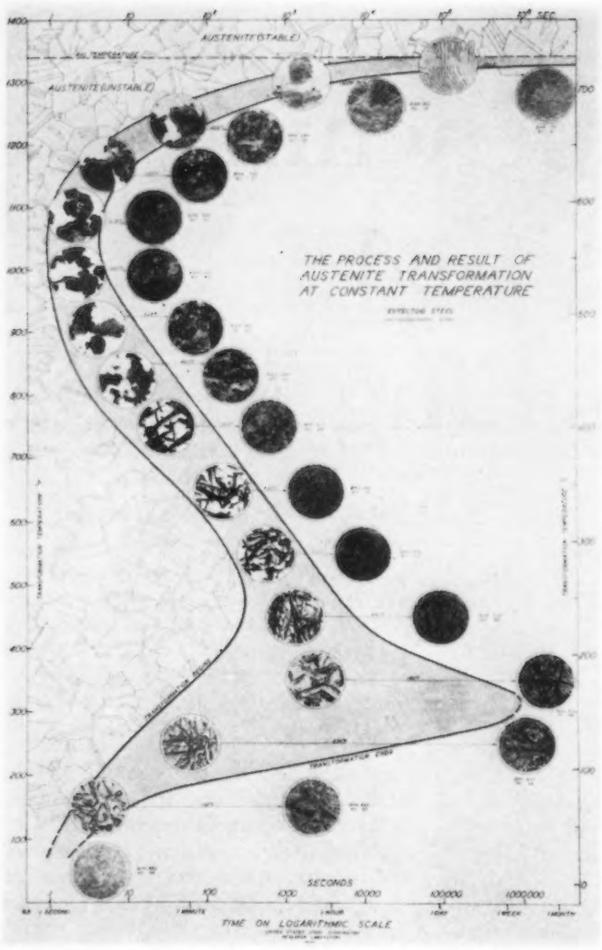

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FIG. 1 — The process and result of austenite transformation at constant temperature. Reproduced by permission of Carnegie-Illinois Steel Corp.

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still quench owing to the formation of vapor blanket and soft spots. Sodium hydroxide solutions (NaOH) give a very rapid quench, taking hold very quickly at high temperature, and giving a very rapid quench right down to close to room temperature, thus forcing transformation to a very low temperature. Scale is violently thrown off during the quenching operation. Disadvantages of sodium hydroxide solutions are (1) they are very corrosive and dangerous to the operator, and (2) they deteriorate rapidly due to the absorption of carbon dioxide from the atmosphere.

A 5 to 10 per cent solution of rock salt in water is probably the most widely used aqueous quenching media; although corrosive to metal tanks it is not dangerous to the operator. When salt is dissolved in water, owing to its selective solubility characteristic, dissolved gas is thrown out of solution and escapes. This can be readily demonstrated by adding salt to a carbonated drink such as soda pop or beer, the violent effervescence is due to the dissolved carbon dioxide being thrown out of solution. Thus brines are free from the dissolved gas which during the quench would be likely to form gas pockets on the work, thus keeping the liquid away and resulting in soft spots. Salt, which forms on the work due to the evaporation of water, will decrepitate, thus mechanically removing scale in the same manner as the salt added in the roughing stands at a plate mill helps free the billets from scale. Although not quite as fast as sodium hydroxide or water sprays a brine quench is much faster and safer than a still water quench. Brine also wets the work better than water. If work is heated in molten salt baths a running water quench is best, as drag-out from the heating bath would contaminate a brine tank and change its characteristics.

No. 2 is the old reliable when it comes to oils, and it is hardly possible to go into any heat-treating department and not find at least a barrel of No. 2. Peanut oil makes an excellent quench for high speed steel, owing to its high flash point. Factors affecting the result of an oil quench are temperature of the oil and its rate of flow relative to the work, oxidation and scale on the work, as well as degree of finish—the last two will affect the result from any quench.

In order to predict the result of any quench it is necessary to know something of the properties of the steel with relation to cooling speeds as well as the properties of the coolant. This is nicely summarized by the excellent work of Drs. E. C. Bain and E. S. Davenport in the laboratories of the U. S. Steel Corp. on decomposition of austenite, and the resulting S curve of austenite decomposition. The familiar iron-carbon diagram is a graphic statement of the temperature at which transformations occur during heating; however, upon subsequent cooling at different rates, in order to understand the different results that may be obtained, THE TIME REQUIRED FOR AUSTENITE DECOMPOSITION at definite temperatures must be considered. This is best shown by the S curve of Bain and Davenport (Fig. 1), which shows the result of austenite transformation at

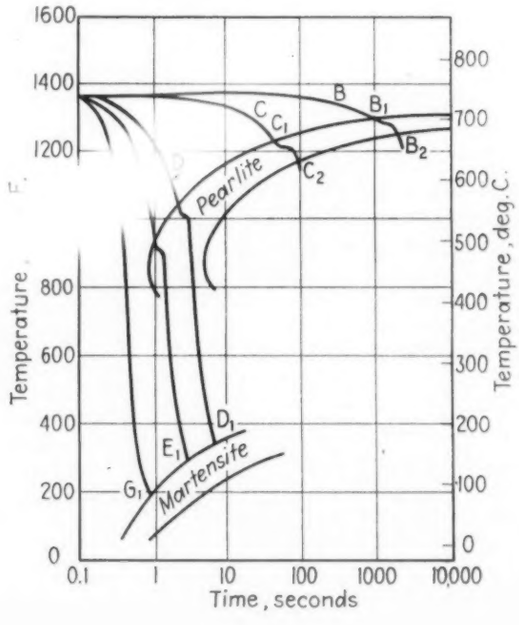

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FIG. 2 — Cooling rate curves superimposed on the S curve to the same time scale. Reproduced by permission of Carnegie-Illinois Steel Corp.

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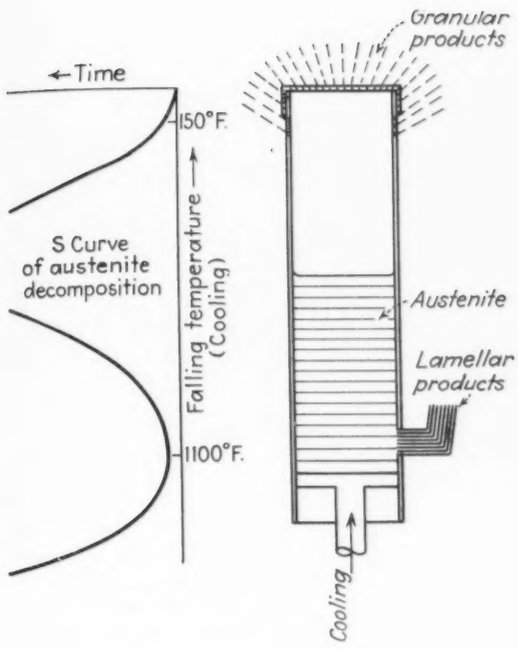

LEFT

FIG. 3 — Mechanical analogy of S curve.

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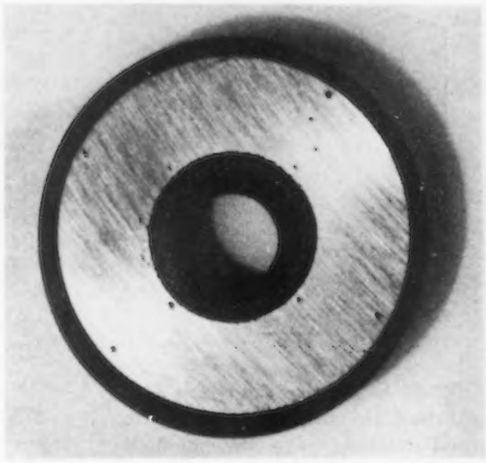
RIGHT

FIG. 4 — Drawing die flush quenched through hole. Note Rockwell impressions around the hole and at edges. At edge $R_c = 38$; at hole $R_c = 67$.



constant temperature. This diagram illustrates for a typical carbon steel how any change of actual transformation temperature influences (1) the required time for onset and completion of transformation of austenite at constant temperature, and (2) structure and hardness of products resulting from that particular treatment. The chart (Fig. 1) is self explanatory, but attention is called to the two zones of relatively rapid transformation, one about 1000 to 1100 deg. F. and the other at about 100 deg. F. Attention must also be called to two regions of relatively slow transformation one just under the equilibrium line Ae1, and one in the range 900 deg. to 300 deg. F. It is thus apparent that a steel can be made to transform very rapidly or quite slowly, depending on the temperature at which transformation is allowed to take place.

If for the moment austempering is excluded, when a piece of steel is allowed to cool it is usually at some desired rate, obtained by the selection of brine, oil, air, etc., as the cooling medium, and transformation will occur while cooling at the selected rate. If there is superimposed on the S curve the cooling rate curves of various quenching media drawn to the same time scale, the products resulting will be apparent. This is clearly shown by Fig. 2, which figure is from "Carilloy Steels," a publication of the Carnegie-Illinois Steel Corp. In this chart curve B indicates very slow cooling as in annealing. When the temperature of the cooling piece of steel reaches B_1 pearlite transformation begins, and as it proceeds some heat is liberated due to transformation of austenite to pearlite as indicated by the flat part of the curve thus prolonging the time at this temperature. As the temperature drops the rate of transformation becomes more rapid and when the cooling curve reaches point B_2 the transformation to pearlite is complete. Even more rapid cooling is indicated in curve C and here also pearlite is the resulting product, but it will be harder and possess finer lamella.

Curve G cools the steel so rapidly that it is rushed past the nose of the curve so fast that it has no time to form any pearlite at all, and it will continue to cool without transformation until point G_3 is reached, at which point it will form martensite. IN FACT ANY STEEL COOLED AT RATES TO THE LEFT OF THE NOSE OF THE S CURVE OF THAT PARTICULAR STEEL (at about 1000 to 1100 deg. F.) WILL BE FREE FROM PEARLITE NO MATTER HOW SUBSEQUENTLY COOLED. With intermediate cooling rates, such as D and E, the steel will have duplex structure containing some pearlite and some martensite, the proportion of each depending on the time the steel is kept in the high temperature range, with all the pearlite forming that time will permit.

The behavior of the S curve can be illustrated by the following mechanical analogy: If the S curve is inverted so that it appears as shown at the left of Fig. 3, its action is then similar to the piston pump shown to the right. If the cylinder is full of liquid (austenite) and the piston is moving very slowly in an upward direction (cooling slowly) then all the liquid will escape by the side port and be lamellar in structure (pearlite). If the piston is moving rapidly (fast cooling or quenching) the lamellar port is closed off by the ascending piston. The liquid is then

TABLE I

Comparison of Cooling Rates in Various Quenching Media
(In deg. C. at 720 deg. C. Values for center of ½ in. round)

5 per cent NaOH brine	(20 deg. C.)	220 deg. C. per sec.	prepared No. 1 oil	(20 deg. C.)	80 deg. C. per sec.
10 per cent NaCl brine	(20 deg. C.)	190 deg. C. per sec	prepared No. 2 oil	(20 deg. C.)	68 deg. C. per sec.
10 per cent H_2SO_4	(20 deg. C.)	160 deg. C. per sec.	olive oil	(20 deg. C.)	67 deg. C. per sec.
Still water	(20 deg. C.)	140 deg. C. per sec.	cottonseed oil	(20 deg. C.)	65 deg. C. per sec.
Still water	(40 deg. C.)	110 deg. C. per sec.	castor oil	(20 deg. C.)	52 deg. C. per sec.
Still water	(60 deg. C.)	80 deg. C. per sec.	palm oil	(20 deg. C.)	26 deg. C. per sec.
Still water	(80 deg. C.)	30 deg. C. per sec.			

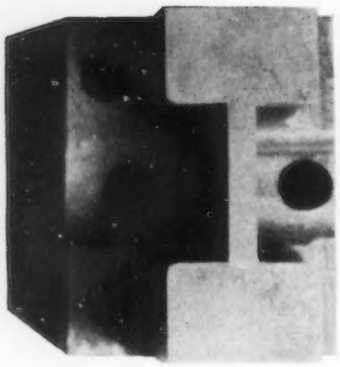


FIG. 5—Poor design with non-uniform sections, cracked with oil quench. The replacement salt quenched satisfactorily.

forced to escape through the top end in a fine spray (granular products or martensite). It is thus seen that if the rate is such that complete transformation does not take place at about 1000 deg. then when it does finally transform it is to martensite with no in-between products. The special case of Austempering will be discussed later.

Most alloying elements such as nickel, chromium, manganese, etc., make the austenite more sluggish and cause it to transform more slowly, thus having the effect of moving the S curve to the right. This means that such steels will fully harden at slower cooling rates, or will harden more deeply or in larger section than will a carbon steel with similar cooling rates. Table II shows the effect of alloy on the critical cooling rates.

Increasing austenite grain size has a similar effect, hence the practice of raising the quenching temperature of certain complicated sections of carbon steel and quenching them in oil with complete success.

CRITICAL COOLING RATES: As critical cooling rates have already been inadvertently mentioned, the critical cooling rate will at this time be defined as a rate of cooling that must be exceeded in order to escape partial transformation in the region 1000 to 1100 deg. F.—that is, the rate necessary to produce complete transformation to martensite. A number of factors affect critical cooling rates such as carbon content, the rate being lowest for a 0.9 per cent carbon steel (eutectic) of any of the plain carbon steels. This can be further lowered by the addition of alloys however. Thus, in the carbon series, a piece of 0.9 per cent carbon steel will harden more deeply than one with either higher or lower carbon content. It will readily develop a surface hardness of R_c 68, and this value is not exceeded by even a 1.20 per cent carbon steel; however, it will not resist abrasive wear as well as the steel with higher carbon content. As shown in Table II, dealing with the effect of alloy on critical cooling rates, alloys and grain size both greatly affect critical cooling rates. However, once the rate is known for a given steel, all that is necessary is to cool the steel at a rate in excess of this value and it will develop full martensitic hardness. It is possible that at some early date some steel maker will publish a catalog with

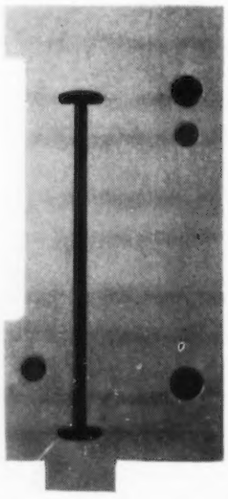


FIG. 6—Poor design with unbalanced section and lack of radii, the result being a crack in lower left corner. Replacement with no change in design salt quenched satisfactorily.

S curves for the various analyses offered, and also celluloid sheets with cooling curves for brine, oil, etc. Thus, by merely superimposing the sheet corresponding to the quench that is proposed to be used, over the S curve of the chosen steel, the resulting structures, their amount and hardness will be apparent.

DIMENSIONAL CHANGES DURING HEAT TREATMENT: Dimensional changes in a piece of steel due to heat treatment are dependent on a number of factors, and of these the expansion due to the formation of martensite and contraction due to hot upsetting are probably of greatest importance. However, shape of the object and conditions during heating and cooling all tend to modify or influence the net result. In heating, a piece of steel does not expand uniformly throughout the complete temperature range at which it is a solid, but will actually show a contraction at a certain stage of the heating cycle. The volume change during the early stages of heating is an increase which will be uniform if heating is uniform, and internal stress will be small. However, if heating is non-uniform the forces in one part of the piece will stretch or upset some other part (because steel is stronger cold than hot), this being due to the hot portions wanting to expand but being held by the colder—thus the stronger portions warp or bulge to accommodate the expansion that must take place.

By comparison, quenching is always quite rapid, and the exposed parts are cooled and shrink before the hot remainder, and this hot material is consequently hot upset. Later when the still hot center cools it will try to pull the now cold hard exposed parts with it due to its own contraction, and in this way build up stresses of great magnitude. This may possibly even exceed the elastic limit for the material and result in breakage.

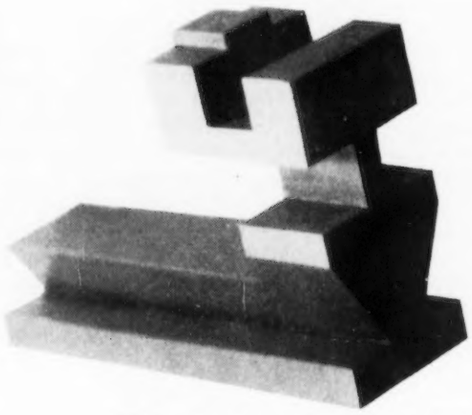


FIG. 7—An intricate section salt quenched without cracking. Oil quenched specimen cracked.

If, for example, a ¼-in. round piece of 0.9 per cent carbon steel is heated and quenched, it will be found to have expanded 0.003 in. approximately in length per inch of original length. Thus, a 6-in. diameter gear made from S.A.E. 6150 steel, which will harden right through will expand an amount equal to about 0.003 in. per inch of anular material (less the contraction due to hot-upsetting). As usually carried out the amount of scaling in the bore will about offset any contraction due to hot-upsetting, and the final bore expansion will not be far from 0.006 in. During cooling the teeth will move in about 1/16 in., and if the web is thin it will cool before the rim and teeth.

This shrinkage of rim and teeth on web may cause stresses that will strip all the teeth off the gear, or if the rim and teeth cool before the body of the gear it will shrink away and will also cause the teeth to break off. An experiment described by Frank L. Palmer of Carpenter Steel Co. will illustrate the magnitude of this hot-upsetting and transformation stresses. A piece of 1.10 per cent carbon steel ⅝ in. in diameter and 3 in. long will harden in brine with a soft core about 0.3 in. in diameter. If a piece of similar steel 0.3 in. in diameter and 3 in. long is quenched in oil from 1500 deg. F. its structure will be similar to the core of the brine quenched piece ⅝ in. round. If the length of the oil quenched specimen is measured, it will be found to be still 3 in. in length. A brine quenched piece 0.3 in. in diameter and 3 in. long would be 0.010 in. longer after quenching. This shows that expansion only takes place when the piece hardens and martensite is formed. If the ⅝ x 3 in. piece had been measured after a 1425 deg. brine quench, it would have been found not to have lengthened at all but to have bulged 0.0015 in. It will possess 77 per cent of hard case and 23 per cent of core, and thus the core would have been unwillingly dragged along with the case. Now, if all the hard case were removed by centerless grinding but without touching the ends, the core will now measure 0.008 in. short of 3 in. long. From Young's Modulus for steel the stress necessary to stretch the core 0.008 in. amounts to 80,000 lb. per sq. in., a value of considerable magnitude. When unfavorable strains of this order can be built up, it can readily be seen how the useful elastic limit of the material can often be greatly reduced by quenching. In the case just cited it would only require an external strain equal to the difference between 80,000 lb. per sq. in. and the tensile strength for the material to produce fracture.

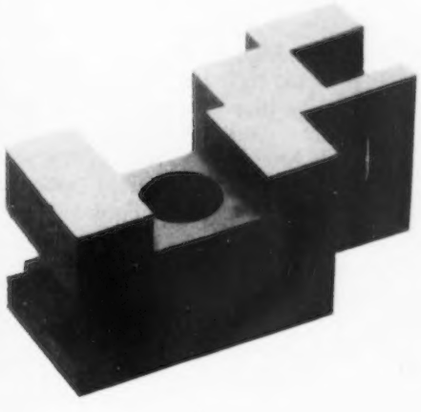


TABLE II

Effect of Alloy on Critical Cooling Rates

Carbon, Per Cent	Carbon Steel	Nickel Steel, 3 Per Cent
0.20	1260 deg. per sec.	78 deg. per sec.
0.80	290 deg. per sec.	32 deg. per sec.
1.20	415 deg. per sec.	50 deg. per sec.

In some instances a piece of steel may be quenched in such a manner that the strains may be favorable and actually add to the resulting strength of the material. This is illustrated if a ring of 30 per cent nickel steel (which does not undergo the martensitic transformation) is flushed through the hole with water—favorable strains are set up which resist bursting stresses in use. During such a quench the center cools first and shrinks, pulling in or hot-upsetting the outer ring toward the center. The outer portion as it later cools will further contract of its own accord, and like a steel band being shrunk on will put the inner portion in compression. If the outer portion is machined off, the inside diameter of the bore will expand considerably as compression stress is relieved. If this ring had been a section of a gun barrel it would resist bursting stresses better, because in addition to the elastic strength of the material there would be the negative stress due to compression to overcome before bursting would occur. If a 1.10 per cent carbon steel 1⅞ O.D. and 0.650 I.D. is substituted the compression stress when relieved by machining off the outer material down to a ring with ⅛ in. wall will allow the bore to expand 0.0025 in. This is equivalent to a stress of 115,000 lb. per sq. in., the sum of hot-upsetting and stress due to the formation of martensite. In such applications as drawing dies this first 115,000 lb. per sq. in. will be additional to the normal strength of the steel, as the first 115,000 lb. per sq. in. of applied strain will merely push the material back where it wants to be anyway. Such an application is shown in the drawing die shown in Fig. 4.

Thus, in some cases the strains may be favorable, and in such cases drawing may be omitted as it would tend to remove them by stress relief. When undesirable, however, quenching strains due to hot-upsetting may be substantially removed by a long draw at 200 to 400 deg. F. But structural expansion due to the formation of martensite cannot be eliminated as long as the enlarged structure remains, and thus carbon steel will remain expanded until a tempering heat of over 400 deg. F. is employed. An interesting exception occurs in the case of the manganese oil hardening steels as usually quenched in oil. When quenched in this manner they usually retain some austenite, and as normally tempered show a minimum expansion. Now, in the case of gages made from this material and so heat treated, if they should happen to be ground a few tenths undersize they can be saved by re-tempering to 450 deg. F.; the retained austenite will break down into martensite with a resulting expansion, which is often enough to render the gage oversize and allow for resizing. The drop in hardness in so doing is negligible. It has been further observed that the manganese oil hardening steels are prone to considerable breakage when oil quenched especially if the section contains many sharp corners. It so happens in die and gage work that such dangerous sections cannot always be avoided. In such cases if the S curve is consulted there is another possibility that suggests itself. The relatively slow transformation rate particularly below 1000 deg. F. suggests a delayed quench in a molten salt bath, similar in every way to the delayed quenching of high speed steel. This was tried, using a sodium-potassium nitrate eutectic bath at 300 deg., with amazing results. Most intricate pieces were made and carelessly handled, and since adopting this method on production there has not been a single case of breakage. All the bath does is to extract the useless heat down to about 300 deg. F. at a rate in excess of the critical cooling rate past the nose of the S curve. Finally, as the temperature gradient from 300 deg. down is small, the pieces are set on the floor to cool, and regardless of the section transform all at one time.

The Rockwell hardness by this meth-

LEFT

FIG. 8—Intricate section salt quenched with no cracks. Oil quenched section cracked.

o o o

RIGHT

FIG. 9—Poor design with sharp corners and no radii.

od is also higher, 64C being the order; this is due to the fact that by this method no austenite is retained, and for this reason the hardness drop when tempering in the 400 deg. to 450 deg. range is slightly higher than with oil quenching. Hot-upsetting during the quench is much less, and owing to the lack of austenite the steel requires slightly more care in grinding — it tending to burn more easily. Other oil hardening steels also respond equally well—S.A.E. 52100 for instance develops a hardness of R_c 69. The high carbon-high chromium steels also respond. Examples good and bad by both methods are shown with suitable captions in Figs. 5 to 9 inclusive. If the manganese oil hardening steels must be oil-quenched it is important to make sure that they are entirely cold prior to tempering. If this is not done there is danger of the die being removed from the oil while still hot internally, at a temperature of 300 deg. perhaps, even though the outside may momentarily appear to be cold. If immediately placed into the tempering oil and held in the range 300 to 400 deg., the steel may not actually transform or harden throughout, but may remain dormant until after removal from the oil and then once it is cold it will finally harden with tremendous internal stresses being set up. These stresses very often break the tool. An example of such a break is shown in Fig. 10. When this section was removed from the quenching oil and placed in the tempering oil only the outer portion had already hardened, the remainder hardening while cooling from the tempering with enough expansion to break the piece. Duplicate sections were all satisfactory after being allowed to cool until they could be carried by bare hands, prior to tempering. A similar plan is advocated when hardening high speed steel, but in this case the tools are quenched into molten lead heated to 900 to 1000 deg. and when fully equalized allowed to cool on the floor. These tools should also be cold to the hand prior to tempering. For high speed steel a second draw at 1050 deg. is also recommended, and a final draw at 500 deg. This final draw will eliminate any stress set up during unequal cooling from the 1050 deg. draw, and is particularly valuable if one of the 1050 deg. draws is eliminated, as it will lessen the stresses due to the formation of martensite while cooling from the first draw due to the breaking down of retained austenite from the quench.

BREAKAGE: Although soaking is generally recommended many of the steels

FIG. 10—Result of too early removal from quench and tempering before entirely cold.

used for dies are prone to cracking after such soaking at high temperature. Hot die steels for example are particularly bad actors. In die sections, similar to the one shown in Fig. 11, cracks may show up in the inside faces of the hole or impression. Soaking such a die insures nearly complete solution of the carbides even at the center of the section, and during cooling in oil insures a cooling rate at the center fast enough to permit nearly 100 per cent martensite formation. Owing to the thermal gradient existing between the center and the surface, the cooling rate at the surface must be greatly in excess of the critical cooling speed for the steel, and considerable austenite will be retained at the surface. Thus a fully martensitic core is obtained which expands considerably, and an austenitic case which wants to contract —this combination sets up terrific stresses. As the inner surfaces of the impression or hole contain the exposed interior of the bar with its more open structure and more massive carbides, with any segregation that may be present it is not uncommon to find such surfaces cracked. (See sketch of such a section in Fig. 11.) This type of

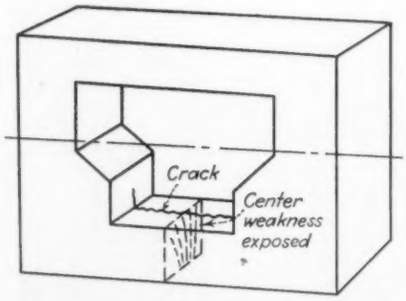


FIG. 11—Cracking in hot die steel.

cracking is readily demonstrated by sawing a piece of flat high speed steel down the middle longitudinally and then hardening the two halves—longitudinal cracks will develop on the exposed interior face. In such cases underheating is beneficial. Another source of cracking in the high speed steels is the non-removal of all decarburization from the surface prior to hardening. This decarburized material is unable to adjust itself to the expansion of the sound underlying material during transformation. The decarburization of the cobalt type steel during actual heating will cause it to crack in a similar manner.

AUSTEMPERING: Another very popular method of quenching developed after a study of the S curve is Austempering[2], for if instead of quenching steel down to room temperature, it is transferred from the high temperature to a molten bath at 500 to 600 deg. F. and held there till it has completely transformed at that temperature, it will have rather unique properties compared with quenched and drawn specimens of the same steel at corresponding hardness if above R_c 40. The relative lack of ductility of the quenched and drawn specimens as compared to those Austempered is thought to be due to the formation during quenching in brine, etc., of sub-microscopic cracks, resulting from stresses of great magnitude induced within individual grains by transformation and accompanying changes in density and volume. Tempering of course does not heal up these sub-microscopic cracks, and the discontinuities thus created lower the ductility in the same manner as does the graphite in cast iron. In the case of carbon steel it is generally necessary to use a lead-bismuth bath instead of salt in order to get a fast enough quench past the nose of the transformation, i.e. past 1000 deg. F. The maximum section that can be austempered is limited by the depth of penetration, in other words by the rate of transformation. For a 0.9 per cent carbon steel this is about ¼ in. To date this treatment has been successfully applied to automobile and aircraft parts, springs, cutlery, cotter-pins, lock washers, etc.

In conclusion the author would like again to point out that the properties of any quenching medium are only important insofar as the rate of cooling they provide. To secure any desired set of properties, it is only necessary to study the S curve of the steel in question, and then select a coolant with a cooling rate that will provide the desired products of transformation in the desired proportions.

[2] For extensive description, see THE IRON AGE, Aug. 31, 1939.

GRINDING bucks in the new castings cleaning department. Fine particles which ordinarily would fill the air are now exhausted through the grilles on which the work is placed.

Grinding and Sanding Castings Without Dust

UNIQUE facilities which eliminate the worst features of the work of grinding and sanding castings and which make it possible to perform this work within a few feet of precision machining operations, have just been installed in the new addition to the Monarch Machine Tool Co. plant at Sidney, Ohio. By means of the same type of down-draft ventilating system that the company recently installed for the spray painting of completed lathes, castings are now being ground, spray painted and sanded at one end of the machining building without partitions to separate the departments.

The top of each working station is a large grating, through which air is exhausted to quickly pull away the cloud of rust, sand and other fine particles, such as paint. With the gratings for lathe beds and other large castings located on the floor and those for the small castings located at 16, 20 or 32-in. levels, the men are never in a position to inhale the dust or fumes, nor do they ever have to work in a bent-over position.

To facilitate handling of the large castings, the three floor stations are connected by means of a 54-in. track. Riding on a dolly, the heavy castings are moved from the receiving department through the grinding, painting and sanding operations to the machining department, without further lifting.

The units in the small castings grinding section include a two wheel snagging grinder, a horizontal disk grinder, both units with separate exhaust equipment, and four grinding bucks for supporting castings while being worked upon by portable air driven tools.

In the small castings paint department are two 4x8-ft. grilles. Spray paint particles pulled down through these grilles are carried away by means of water solution and eliminator packs located underground. The equipment in the sanding department includes four grilles each 5 ft. square, but at varying levels. Here a water vapor is used in connection with the blower fan to eliminate the sand particles in the form of sludge.

All the units are exhausted through the roof. The two painting outlets are carried 30 ft. into the air to eliminate any possibility of the fumes reentering the plant through the monitor windows. The total amount of air removed is 50,000 cu. ft. per min. at an average surface velocity of 200 ft. per min.

The blower equipment consists of five Rotoclone type fans located in a small room. The pressure paint supply comes from 10-gal. tanks located just beyond the blower room. There are separate lines for crankcase white, primer, filler, sealer and color lacquer for finishing. The piping system for the entire installation, including exhaust, compressed air and paint lines, is entirely under the floor.

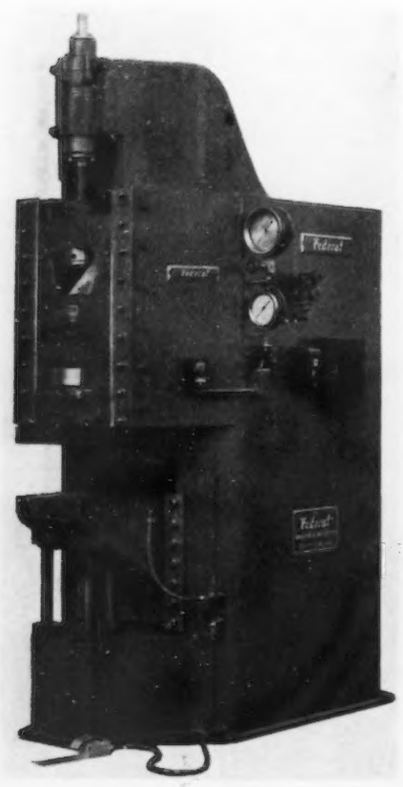
DOWN-DRAFT ventilation through the grille-topped tables makes this sanding operation on painted castings clean and safe, eliminating the need for masks.

What's New in Welding Equipment

JUDGING by the number of announcements made by makers within the last few months, the principal developments in welding apparatus have been in resistance welding machines, including spot, projection, butt and gun welders. An extremely high production multiple spot welder has been built for the automotive industry. There is a trend toward a standardization of sizes of spot welders. Among arc welders described in this review are several transformer types, as well as generator types. In gas equipment, advances are confined to cutting machines and gas regulating devices.

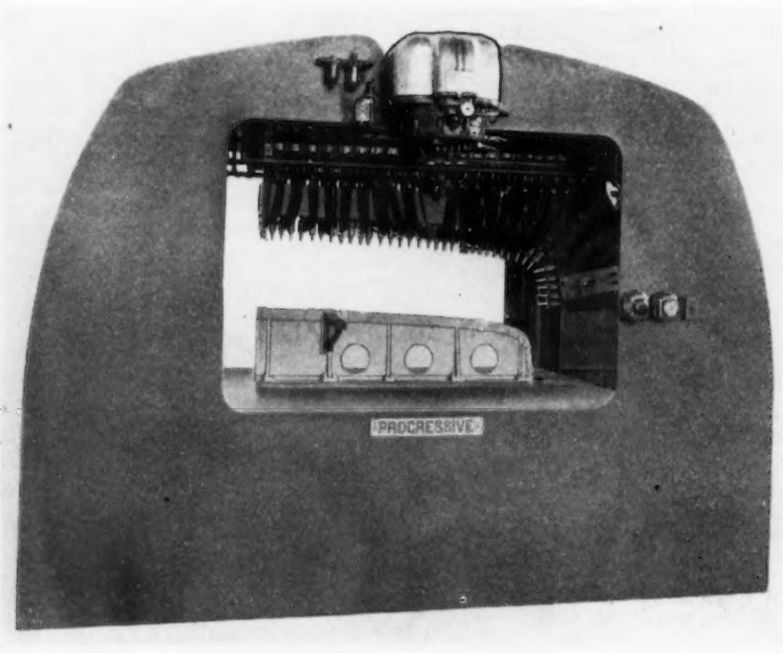
o o o

SUITABLE for continuous use under high production schedules is the heavy-duty projection welder, available in hydraulic, air or motor operated types, introduced by *Federal Machine & Welder Co.*, Warren, Ohio. This unit, model P-4, is offered in five transformer capacities ranging from 250 to 600 kva. A regulator switch mounted on the welder, gives eight steps of heat regulation. Stroke of the welding slide is adjustable from 1 to 4 in. and the lower combination knee and platen has an 8-in. vertical adjustment. Accompanying photograph shows hydraulically operated machine with a two-pressure pump. A comparatively small motor is required for pump as low pressure is used for bringing slide down until electrodes contact the work, then machine is automatically thrown over to high pressure to perform actual welding operation. At completion of weld, head is returned by low-pressure supply. An adjustable pressure switch operates the timer, thus allowing a pre-determined pressure to be set and insures holding the timing circuit off until required welding pressure is built up. Both upper and lower platens are 14 in. sq., and are fitted with T-slots. For work requiring quick follow-up, welder slide may be fitted with low-inertia head built in the slide and controlled by an air cylinder, eliminating weight applied to electrodes.



High Speed Spot Welder

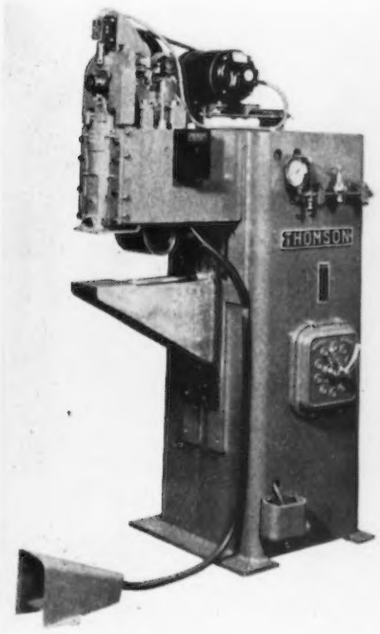
CAPABLE of making upwards of 6000 spot welds per hr., the new Progress-O-Matic high speed spot welder developed by *Progressive Welder Co.*, 3017 East Outer Drive, Detroit, features an entirely new method of current transfer which makes and breaks the secondary as well as primary circuit. This transfer system is said to give the machine such flexibility that it can weld an assembly having several thicknesses of metal. All welding points are brought down



on work under full pressure and held there throughout the welding cycle. Chance of burned welds is virtually eliminated as points are on the work before current is introduced and remain there after current is off. Welder is provided with quickly interchangeable lower electrodes to accommodate different sized assemblies. Unit illustrated makes 36 spots to join two halves of automobile hood tops. Rapid operation is obtained through built-in timing mechanism, requiring only one transformer. This timing unit permits timing up to as high as 24 cycles duration, or 0.4 sec. Interrupted timing for heavy duty welding is also possible. All welding points can be adjusted to a predetermined pressure by means of a high pressure spring. Scale on each gun permits direct reading of pressure.

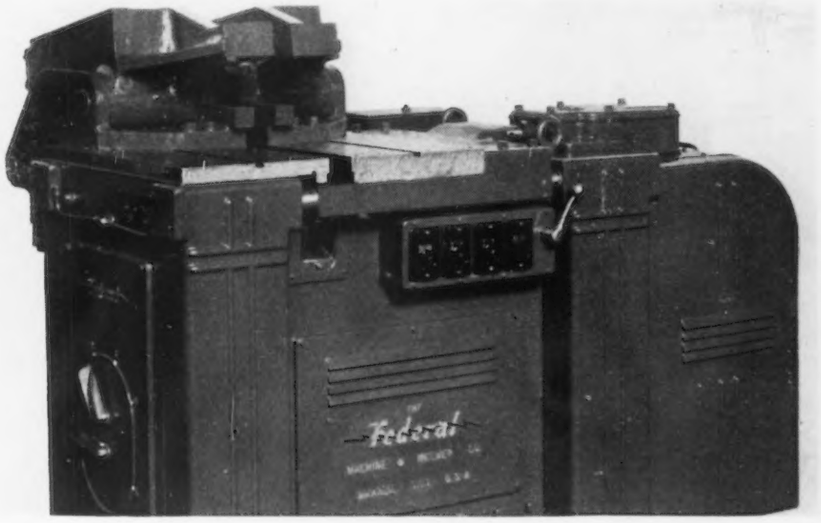
Welding Press

A HIGH degree of interchangeability features the new model No. 1 welding presses announced by *Thomson-Gibb Electric Welding Co.*, Lynn, Mass. This interchangeability is said to reduce original costs and make it possible to remodel the machines at any time to suit new requirements with a minimum of labor and expense. Standard units consist of a fabricated frame in which is housed the company's new tubular secondary water cooled transformer. A thermal relay switch in transformer protects against cooling water supply failure. Transformer ratings available are 30, 40, 50 and 75 kva. Peel-off shims provide for adjustment for wear in sliding head. Head is actuated by a cam designed to slow down the electrode as it aproaches the work to minimize electrode hammering. Head is returned by two compression springs. A variable speed pulley driven by ½ hp. motor gives infinite speed selection between standard ranges of 36 to 109, or 44 to 133 strokes per min. Unit will operate at electrode pressures up to 1000 lb. and throat depths of 12, 18, 24 and 30 in. are available. Press illustrated is standard machine with spring head and lower socket bolted to apron.



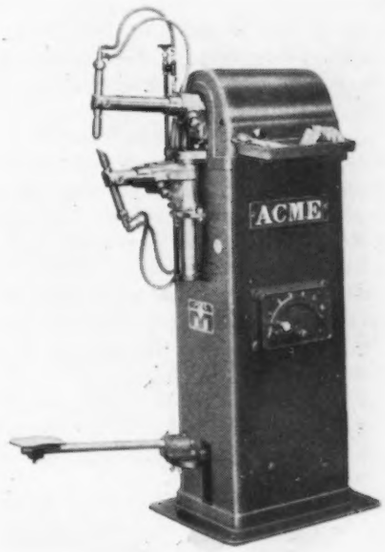
150-Kva. Flash Welder

FEATURING flat top platens on which may be mounted various types of clamping fixtures to accommodate the many varieties of welding jobs confronting the average plant, the new type F-4 flash welder announced by *Federal Machine & Welder Co.* is available in capacities up to 150 kva., suitable for welding stock up to 1 sq. in. welding area. The unit may be used for welding rounds, flats or formed sections. This machine, as in other *Federal* flash welders, employs a side bar construction which has the effect of a long slide for the moving platen of the unit. With this arrangement, the slide is carried in sealed bearings on each end of the supporting members of the frame in sealed-in type slide bearings which are continuously lubricated and protected from flash. Parallel keyways on the platen assure accurate alinement of the clamping fixture. The flash chute is easy to clean and acts to seal the flash that blows away while weld is being made and prevents it from getting into transformer compartment. Cam which controls flash and upset period of weld is motor driven through a gear reducer.



Foot Operated Spot Welder

AN improved line of foot operated, rocker arm type spot welders for light sheet metal work has been announced by *Acme Electric Welder Co.*,



Huntington Park, Cal. Welders are made in two models, type 0 with stationary horn holder, and type 1 (illustrated), with swivel lower horn holder, and are supplied in capacities of 10, 15 and 20 kva. and with throat lengths of from 12 to 36 in. A clamping block device retains the horns in the horn holders with good electrical contact, but a half turn of a set screw instantly releases the horn. Reversible

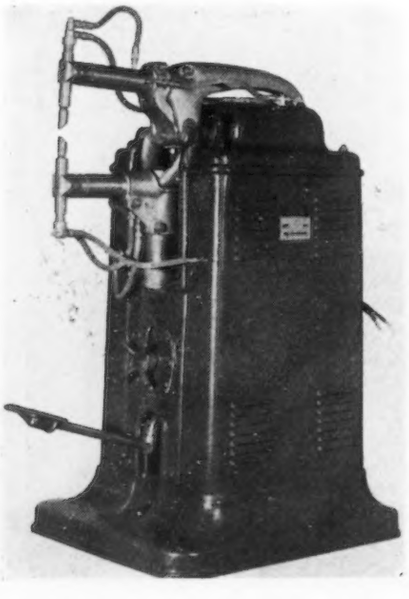
double end horns are supplied, with one end machined to hold electrodes at 90 deg. angle and opposite end at 22½ deg. angle. On type 1, maximum spacing between horns is 11 in. and minimum 5 in. Extra long column giving maximum spacing of 26 in. is available.

Welder with Burr Grinder

A NEW 3 kva. portable butt welder (not illustrated) with a burr grinder and annealer mounted on a fabricated case which is an integral part of the welder, has also been announced by *Eisler Engineering Co.* Unit has an eight-point variable switch for current regulation, is foot operated and butt jaws can be water-cooled for continuous operation. Metals from 1/16 to 3/16 in. diameter can be accommodated, either in solid or stranded form. Grinder has an adjustment to compensate for wear in abrasive and two bushings guide wire to the grinder which squares off the ends to give neater welds.

Standardized Spot Welders

A STANDARDIZED line of spot welders in three sizes of frames, all having the same characteristics of design and a high degree of interchangeability of parts, is being offered by *American Electric Fusion Corp.*, 2610 Diversey Avenue, Chicago. One frame houses both 10 and 15 kva. transformers, a second covers both the 20 and 30 kva. units, while the third houses the 40 and 50 kva. transformers. This standardization is said to have permitted a reduction in prices.



Special High Speed Spot Welder

A SPECIAL high speed production spot welder of 5-kva. capacity has been built by the *Eisler Engineering Co.*, 740 South 13th Street, Newark, N. J., for welding small flat pieces of metal to cylindrical shaped tubes. The machine is adaptable, however, for work of a similar nature on other assemblies. The welder shown is air operated and is supplied with a suitable automatic timer and contactor.

There are two operators used, one to load the fixture, the other to operate the foot switch and index the fixture laterally after each weld. The machine operator can attain a speed of 150 spots per min.

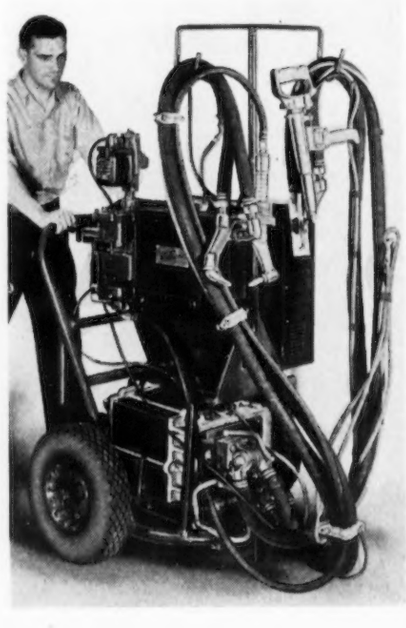
Portable A.C. Welder

AN all-purpose portable Flex-Arc a.c. welder designed for general utility service and production welding of every type, has been announced by *Westinghouse Electric & Mfg. Co.* Standard models operate on either 220 or 440 volts, have from 20 to 250 amp. of welding current available in 27 current steps, and are completely self-contained. Built-in De-Ion breaker insures protection against long sustained overloads and can also be used to disconnect machine from the line without going back to a service switch. Striking voltage is around 80 volts at 20 amp., and ranging down to 50 volts at the highest current rating. High

power factor and low no load losses insure maximum operating efficiency. Complete accessories are furnished.

Two-Gun Portable Welder

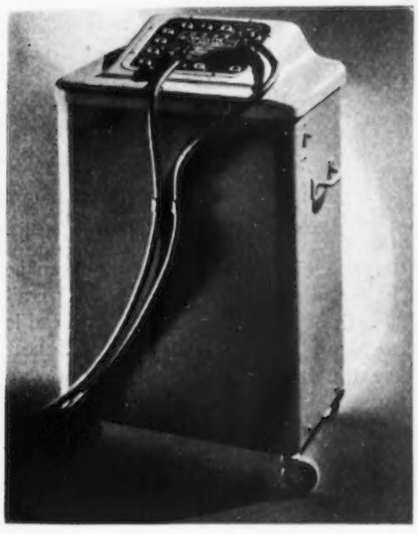
A TWO-GUN portable spot welding unit designed for heavy duty work requiring high point pressures, large capacity transformers and adjustable weld time control is announced by *Progressive Welder Co.*, 3017 East Outer Drive, Detroit. Equipped with floor saving pneumatic tires, this unit is easily moved from one assembly location to another. Only connections necessary to operate machine are air lines for pressure booster, water lines for cooling cables, points, etc., and power lines. Push, scissors or sliding contact guns can be used. When welder is to be used for more than one type of work, a special



timer having two separate control dials permits adjustment for two separate weld times for each gun. Two operators can work simultaneously.

15 to 250-Amp. Arc Welders

ALL controls and sockets of the new a.c. arc welders offered by *Ergolyte Mfg. Co.*, 3644 Lawrence Street, Philadelphia, have been brought into full view on a sloped panel, to simplify selection of heats. These welders employ a broken wave current which, it is claimed, makes them unusually stable and quiet in operation, regardless of how unsteadily the electrode is held. Smooth, uniform beads and fillets, free from undercutting and pil-



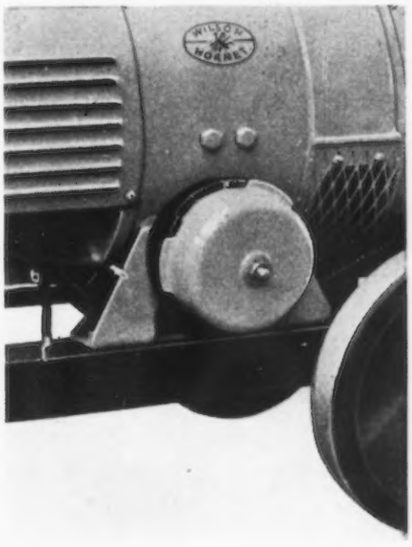
ing up, with low spatter loss, are advantages claimed for this type current. Model 160 has current range of 15 to 160 amp., and model 250, illustrated, has a range of 15 to 250 amps.

Generator Type Arc Welder

THE new model WD-150 generator type arc welder introduced by *Harnischfeger Corp.*, Milwaukee, measures less than 33 in. in length and 1 ft. in height, but delivers uniform welding currents ranging from 15 to 200 amp. Current selection is simplified by a single control which, once the setting has been made, causes the generator to automatically respond with the desired arc length under all conditions. Mis-synchronization of open circuit and arc voltage is said to be impossible due to automatic volt-ampere regulation, self-excitation and internal stabilization. Square frame construction gives greater compactness.

Dual Voltage Switch

DUAL voltage switch for installation on arc welding machines when such machines must be used on either of two line voltages at different times has been developed by *Wilson*

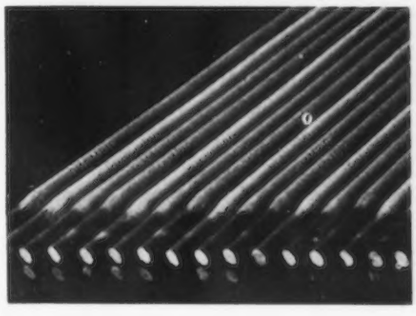


Welder & Metals Co., Inc., 60 East 42nd Street, New York.

This device, called the Type CH Dual voltage switch, consists of two main parts, a base which is mounted directly on machine and a removable cover. It can be used on any a.c. motor provided motor and starter are reconnectable for two voltages. Change from one voltage to another with this switch can be made in less than 1 min.

Identifying Welding Rods

CHAMPION RIVET CO., Cleveland, has put on the market welding rods on which the company's name is imprinted to aid in identifying the rods. In the past, efforts have been made to permit distinguishing different rods by using various colors, but it is believed this is the first time the name of a manufacturer has been imprinted in the flux coating.

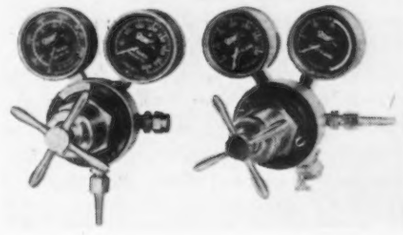


Hard-Facing Alloy

A NEW hard-facing alloy, known as Stoody AC and designed especially for application by a.c. welding machines, has been developed by *Stoody Co.*, Whittier, Cal. This new electrode flows freely under the arc, the manufacturer states, produces very little spatter and forms a hard, tough, wear-resistant deposit. Rod is available in three sizes.

General Service Regulators

THREE new single-stage general service regulators for welding and cutting gases have been introduced by *Linde Air Products Co.*, 30 East 42nd Street, New York. These regulators are the Oxweld R-80 oxygen regulator for delivery of oxygen at working pressures up to 200 lb. per sq. in., the Oxweld R-81, its companion acetylene regulator, and the Oxweld R-82 fuel gas regulator for use with various petroleum gases as propane and butane. These regulators are designed to give dependable service in all welding, cutting and deseaming operations where refinements of Oxweld two-



stage regulators are not required. All three type models are of the stem type wherein the valve closes with incoming pressure. Model R-80 has an inlet screen of double thickness of fine mesh to filter out dirt and foreign particles.

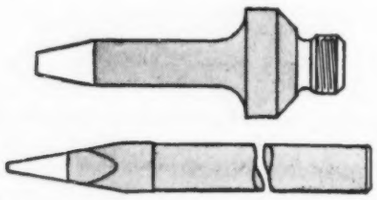
Two Stage Regulators

A TWO-STAGE regulator, known as Model FF, has been announced by *Alexander Milburn Co.*, 1493 West Baltimore Street, Baltimore. The first stage of these regulators can be adjusted to various pressures, thus permitting it to be used for different operations. After selected pressure is set, delivery stage may be adjusted to any desired working pressure up to 200 lb. Valve assembly has only four parts—a small body, stainless steel spring, stainless steel ball and a vulcanite seat. Fach stage has a loose replaceable diaphragm, and removable and interchangeable inlets.

Non-corrosive filter screens enclose seat units.

Armor Clad Soldering Tips

A NEW line of armor clad soldering tips for screw tip and plug tip electric soldering irons has been announced by *Stanley Tools*, New Britain, Conn. The usual copper tip is covered with a thin, special metal coating which gives the tip the high heat conducting value of copper and



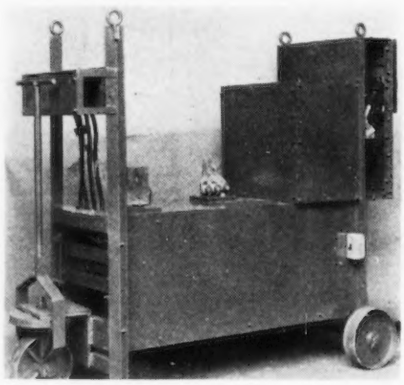
also protects the tip from rapid oxidation and corrosion. There is no erosion with the new tip, it is said, because solder does not amalgamate or alloy with the new metal coating. Armor clad tips can readily be tinned and filing is not necessary.

400-Amp. Diesel Arc Welder

APPLICATION of gasoline engine starting on diesel driven arc welders, announced previously on a 300-amp. unit by *Lincoln Electric Co.*, Cleveland, has been extended to the company's 400-amp. model. Gasoline starting is said to make possible easy starting in any weather. The starting engine is mounted above the diesel and is itself started by a hand crank. A belt drive, engaged by means of a clutch, connects the starting engine to the diesel. Starting in extremely cold weather is facilitated by having the cooling system of the starting engine connected with the cooling system of the diesel. Running the starting engine a few minutes allows the heated water circulating through both the diesel and the starting engine to warm up the diesel. The 400-amp diesel welding generator features dual continuous control which permits independent adjustment of both voltage and current. Fuel consumption of this diesel welder is said to be 1.5 gal. per hr. at full load operation.

Weld Preheating System

AN induction hysteresis preheating-welding - normalizing system, which can be used for shop as well as



field work on pressure vessels, high pressure piping, penstocks, etc., has been developed by *Electric Arc Cutting & Welding Co.*, Newark, N. J. Illustrated is a 90 kw. unit used in a boiler fabricating plant on vessels which, it is said, require more accurate control than can be obtained with furnace, gas or oil heating. With similar apparatus, 30 ft. lengths have been preheated with three complete turns of 500,000 circular mil cable laid along the section to be cut or welded in the form of a flat ellipse.

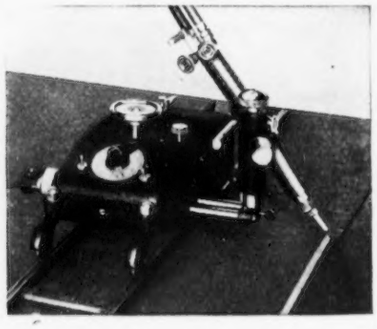
Weld Chipping Hammer

FEATURING a combination chisel and drift point, to facilitate working in close quarters, the new hammer for chipping off slags and other general chipping purposes being

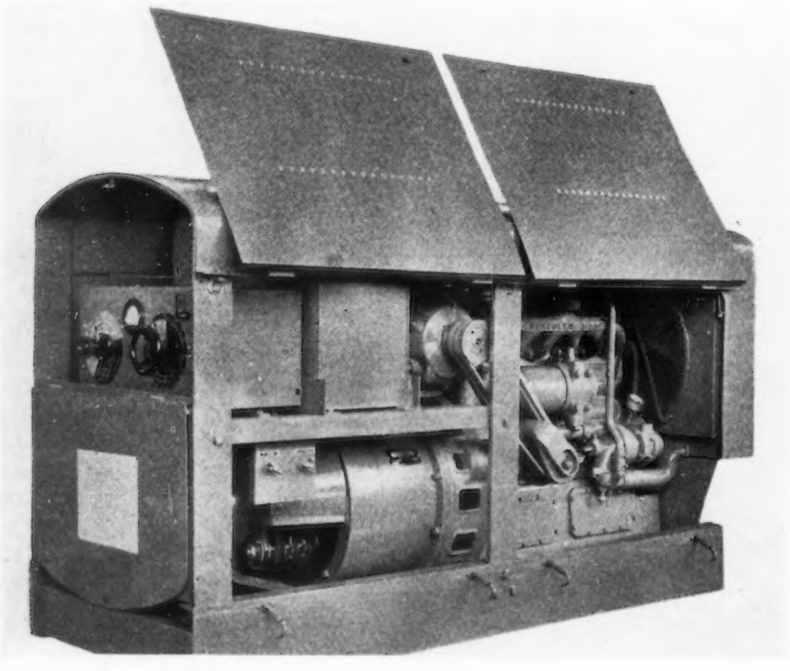
offered by *Chicago Mfg. & Distributing Co.*, 1928 West 46th Street, Chicago, weighs only 14 oz. and can be easily worked with one hand. Overall length of hammer is 11 in. and head is 5x7/8 in. Hammer is made of heat treated tool steel to withstand severe service.

Portable Cutting Unit

AN improved Model K portable, motor-driven gas cutting machine is offered by *Harris Calorific Co.*, Cleveland. Unit is powered by a universal electric motor and will cut straight lines to any length, with square or beveled edges. Circles from



1 to 86 in. diameter can be cut with standard equipment. Speed range is 3 to 60 in. per min., forward or reverse. Traction is effected through two hardened drive wheels of large diameter. Mounting for two torches is provided and "instant stop" feature eliminates over runs. Tracing feature provides for cutting irregular forms.



41-Passenger Mack Bus with structural members of "A.W." DYN-EL high strength steel.

Mack builds lighter and stronger . . . Reduced dead weight . . . faster schedules . . . safe, economical transportation. "A.W". Dyn-el high strength steel plays an important part in the construction of Mack Buses for 1940. Mack eliminates every unnecessary pound of weight with "A.W." Dyn-el. With all its lightness, Dyn-el is stronger than conventional steel, longer lasting and has greater resistance to shock, fatigue and corrosion. *Fewer pounds of steel to buy means fewer pounds of steel to move.*

The 48-page book, "A.W." Presents Dyn-el, gives full details of savings in weight and cost possible with this new high-strength, flat-rolled steel. Write for a copy.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS, CONSHOHOCKEN, PENNA. : : SINCE 1826 : : DISTRICT OFFICES AND REPRESENTATIVES—Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, New Orleans, St. Paul, Pittsburgh, Roanoke, Sanford, N.C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal—A. C. Leslie & Co. PRODUCTS INCLUDE—Steel Products in Carbon, Copper or Alloy Analyses : : Sheared Steel Plates : : Hot Rolled Sheets and Strip : : "A.W." Rolled Steel Floor Plates : : Billets, Blooms and Slabs : : "Swede" Pig Iron : : Reading Cut Nails.

On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Curtailment of motor car production would hinder, not help, defense program, automobile industry contends . . . Car assemblies creeping up as 1941 programs develop . . . Purchasing agents' records show August was good business month in Detroit

DETROIT—Strange rumblings — offshoots of the bewilderment and hysteria of the war era, no doubt —are tending to disturb the automobile industry by plaguing it with rumors of forthcoming restrictions and uncertainties. It is apparently an attack by some individuals who think, in all seriousness, they can speed the nation's defense program by curtailing automobile production.

A "plowing under" economy has been tried already in agriculture; the manufacturing world is concerned lest curtailment and "plowing under" be forced on it.

Cudgels have been taken up notably by Paul G. Hoffman, president of Studebaker Corp., who spoke emphatically on this topic at the 1941 Studebaker preview. Said Hoffman:

"I have seen suggestions that our building of cars be curtailed, that road building be discontinued, that our facilities be diverted to so-called more fruitful activities. One high public official, speaking off the record, suggested recently that two and one-half billion dollars would be available for defense purposes if automobile production and use were restricted by 50 per cent. A conservative economist at New York University, Wilford R. King, was reported by the newspapers as saying that the best way to curtail automobile production would be to impose a 100 per cent tax on new cars. Mr. King, too, was talking about defense preparations. And apparently he was not joking."

An Answer by Paul G. Hoffman

HOFFMAN attacked these statements, not as dangerous in themselves, but as symptoms of "public and private thinking . . . about the American transportation system which might very well become extremely important to the nation during the serious days ahead." Anyone proposing such an impairment of the efficiency of the railroads or of water transportation, Hoffman said, would "be branded as a Fifth Columnist." The nation cannot afford to become "literally the victim of 'horse and-buggy' thinking," he declared.

Since both the primary and secondary highway systems in the United States are as vital to the military establishment as to private and commercial users, there seems to be no good reason for decreasing highway construction; mere deprivation of commercial highways will not be a boon to the military need for roadbeds—on the other hand, anything that facilitates commercial traffic also moves army vehicles more easily and rapidly. Incidentally, over half of the car mileage in the United States each year is accumulated by vehicles used on business trips, 55 per cent of all travel being for business, it has been learned in road-use surveys, according to the U. S. Public Roads Administration. In rural areas the total is as high as 64 per cent, it is shown in data published in "Automobile Facts and Figures," released through the Automobile Manufacturers Association. Possibly more than 90 per cent of all passenger cars are used at times for business rather than pleasure. The highways accounted in 1939 for 10 times more passenger mileage than all other forms of transportation combined.

Referring to "the job of making the facts clear while there is still time," Hoffman declared that we cannot afford "a holiday in manufacturing." He stood on firm statistical ground when he spoke. It is known that all but a few thousands of the cars built each month of the year are required for replacement of cars gone to the scrap pile. The country has nearly 30 million cars and trucks registered, but two and a quarter million vehicles are scrapped each year. (Last year two and a half million vehicles were scrapped in the United States.) Over the last 10 years, depression years, when cars were run long beyond their life expectancy, the average number of vehicles scrapped amounted to 85 per cent of the total new vehicles sold at retail during that period.

Says Car Users Would Be Handicapped

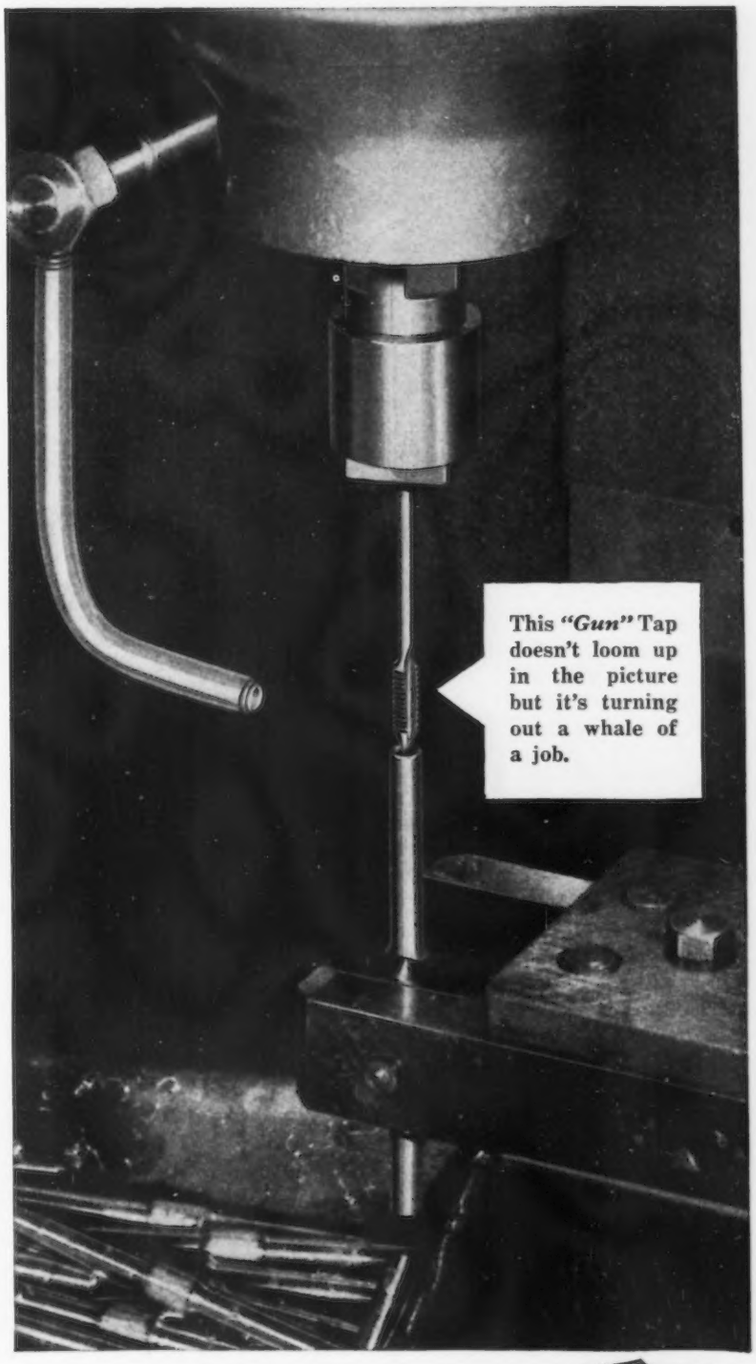
THE cars which are "nearest the scrap heap"—and which *could not* be replaced if a manufacturing holiday intervened—are being operated by those to whom motor transportation is most essential, the lower-income group which often must rely on a used car to get to and from work. Hoffman said: "Curtailment of production would not seriously affect owners of cars one, two or three years old. They can, if necessary, continue to drive their present vehicles. Highway users who would suffer most would be those least able to stand the loss."

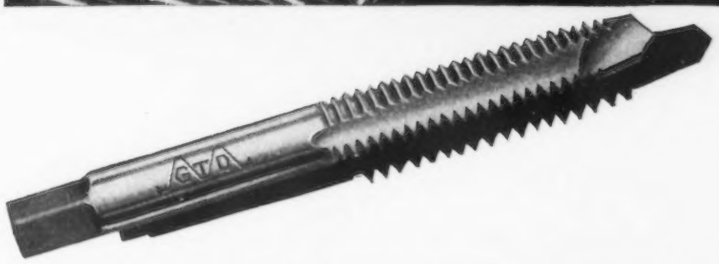
The real argument, which only the "plow under" philosopher cannot understand, is that economically the continuation of a peace-time rate of production is the only possible way of financing defense expenditures. A million men employed in auto and parts manufacturing and oil refining, 3,600,000 truck drivers, more than a million men in sales and servicing, and more than a third of a million engaged in highway work, motor transport, and other phases of the industry — these are making the economic contribution which will help to pay for defense. The taxes of the

MORE PRODUCTION with "GUN" TAPS

When an eastern aircraft manufacturer needed to thread these brass barrels, "*Gun*" Taps were chosen. Why? Because tests proved that "*Gun*" Taps had the combined accuracy and stamina to meet the stringent requirements of the job. Cutting a 10-32 thread through this long barrel requires quite a tap. Special long shank ground thread "*Gun*" Taps were the answer. They churn through at the rate of 550 R.P.M. and turn out two finished jobs every minute. The average production is 6,000 parts per tap—with 1,000 between grinds.

Has your plant a tough job—in brass, bronze, iron, steel, plastic or fiber? "*Greenfield*" engineers can help you lick it. Ask for suggestions.





GREENFIELD TAP & DIE CORPORATION., Greenfield, Mass.

Detroit Plant: 2102 West Fort St. Warehouses in New York, Chicago, Los Angeles and San Francisco. In Canada: Greenfield Tap & Die Corp. of Canada, Ltd., Galt, Ont.

GTD GREENFIELD

TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

industry — now totaling one-ninth of all taxes which are collected in the United States—would dwindle and disappear if a restrictive law tried to put a 100 per cent burden on the industry.

Business Good in August

Along with reports of more long-range industrial buying there is, in the most recent survey of the Purchasing Agents Association of Detroit, a particularly significant estimate of business conditions. Sixty-seven per cent of the purchasing agents in this area reported early this month that August business conditions were better than those of July, 33 per cent reported business conditions unchanged, not a single report of "worse" conditions was submitted. This is the first time since December, 1936, that such all-prevailing optimism has been indicated. Normally, each month of the year finds some one of the varied industries reporting that conditions have slumped a little from the previous month.

As to actual buying, fewer organizations are on a 30-60 day basis and more are buying three, six or nine months ahead. Two per cent are still on a hand-to-mouth basis, but this is one point less than it was a month ago. The change in the 30-day buying figures (dropped from 13 per cent in July to 10 per cent in August) and in 60 day buying (dropped from 18 per cent to 14 per cent) has been just about absorbed into the 90-day buying classification which increased from 47 per cent in July to 53 per cent in August. A one point increase was shown in the six-month group (from 18 per cent up to 19 per cent) and in the nine-month group (from one per cent up to two per cent).

A spectacular "advance buy" was made last week when the Studebaker sales organization in Chicago bought more than a million dollars worth of automobiles from the Studebaker plant on a lump order. A certified check for $1,001,009 was paid in advance for an undisclosed number of 1941 Studebakers. Incidentally, it was reported that the order was made up of about 60 per cent Champions, the low-priced Studebaker. The remaining 40 per cent of the order was made up of Commanders and Presidents.

De Soto raises the ante in a publicity release two days after the Studebaker deal. De Soto asks, "Ever see a car that cost more than a million dollars." The blurb continues "They built one at De Soto last week. It had no diamonds, platinum or other expensive knick-knacks on it, but it was without doubt the most important automobile of the year for De Soto—it was the annual 'pilot job,' the car which first tests whether new dies, tools, jigs and fixtures that have been installed at tremendous cost are properly set for quantity production of new models."

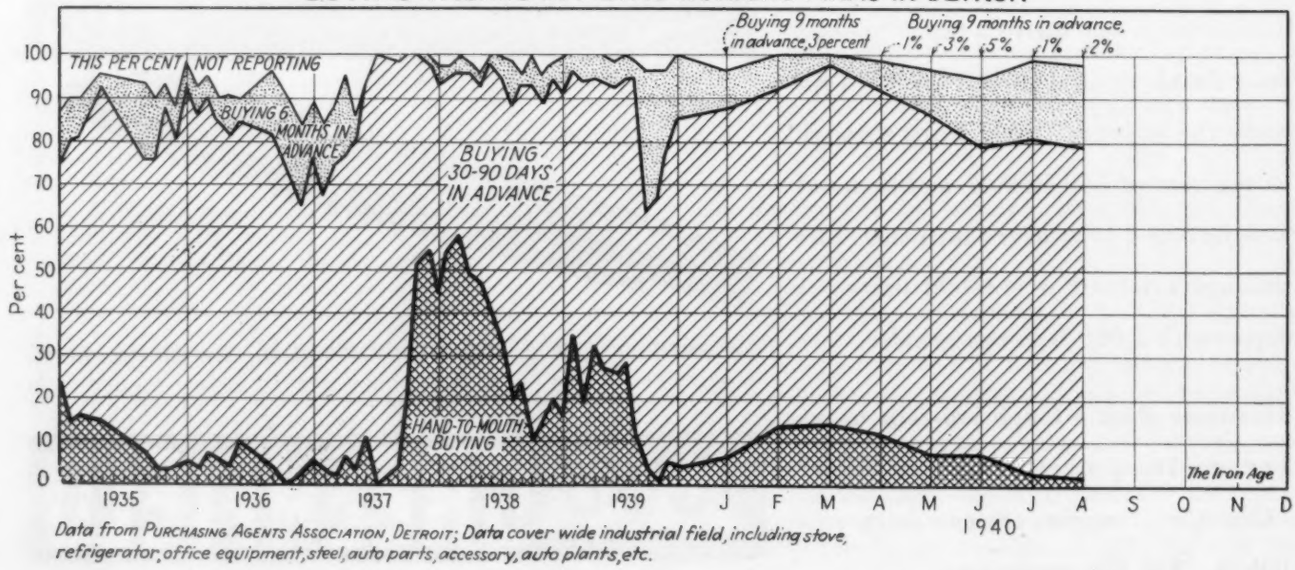
And the owner of the one-millionth Chevrolet produced after Chevrolet's introduction of the valve-in-head six in 1929 will receive the millionth 1940 Chevrolet as a gift, it has been announced by the manufacturers. The millionth 1940 Chevrolet was produced July 12 this year and is being kept in storage pending the award.

A further increase in production of 1941 automobiles was registered last week when the industry's output rose to 39,665, according to Ward's Automotive reports. This is nearly a 50 per cent gain over the previous week's output of 27,645 and continues above the corresponding output last year when the week's assemblies amounted to 26,865 cars and trucks.

Great Lakes Steel 10 Years Old

Michigan's husky "depression baby," the Great Lakes Steel Corp., which has just celebrated its 10th anniversary, is receiving the congratulations of leaders of other Michigan industries, particularly its most important customers, the auto plants and parts manufacturers in this area. Under the leadership of George R. Fink, Great Lakes reestablished Michigan as a part of the steel industry in August, 1930. At the time the first heat was tapped at Great Lakes, 830 men were employed, by 1939 this had increased to 7493, with payroll up from $1,938,000 to $13,700,000. Production has increased from an initial 500,000 tons to an excess of 2,000,000 a year.

BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT



Data from Purchasing Agents Association, Detroit; Data cover wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessory, auto plants, etc.

"High Carbon
Ferro-Chrome of Quality"

Ohio Ferro-Alloys Corporation
Canton, Ohio

Washington

BY L. W. MOFFETT
Washington Editor

• Events this year disprove claims at Washington that price is prime factor in steel demand . . . Taxes far higher than planned now are seen as certainty . . . Defense cost in six years may be 37 billions

WASHINGTON — When first quarter steel prices were reduced New Deal economic planners were quick to claim credit, as undeserved as it was. Just prior to the announcement of lower levels, the TNEC held hearings during which they brought to a focus their old arguments about price "rigidity" and lack of competition. They renewed their pet contention that the relation between price and volume is inverse. By that they mean that as the price decreases the volume increases. This argument was answered by Dr. Theodore O. Yntema, Chicago University economist, who appeared before the committee for the United States Steel Corp. He told the committee that demand for steel is determined primarily by general business activity, consumers' income and industrial profits and to only a minor extent by price. This view is widely held in the steel industry and is based on experience. Dr. Yntema is now an executive in the Economics and Statistics Division of the defense commission's Raw Materials Department.

The first quarter saw a sharp drop in industrial production generally and it saw steel orders decline in the face of reduced prices, a performance that went counter to New Deal philosophy and consistent with the industry's contention. Production would have been less had it not been for European war demands. At that, contrary to earlier New Deal predictions, these demands did not reach an immediate heavy volume. Their effect on the ingot rate was not substantially felt until late spring. Heavy British orders now are sharply reflected in steel operations, sharing a prominence only next to the United States government's own defense demands.

Ingot Rate to Almost 90 Per Cent of Capacity

IN the second quarter prices of sheet and strip products were reduced $4 a ton. This time the New Dealers, strange to say, did not claim credit—at least not outwardly—but, without respect to the effect on profits, were pleased at the slash. It may be strongly suspected that they were aware, again contrary to their pretensions, that keen competition prevails in the industry and enforced lower prices.

With the approach of the third quarter foreign war orders and domestic defense business had pushed the ingot rate almost to 90 per cent of capacity. Despite narrow profits per ton, prices were reaffirmed.

Now they have again reaffirmed, this time for the fourth quarter. Earnings naturally improve as volume increases, but the returns on invested capital remain low, and except for the most irresponsible demagogues, there is no shouting that the steel industry or any other industry is capitalizing on defense needs. At the same time the theory of inverse relationship between price and volume is not working out, though rising demand, permitting higher production, had brought a second-quarter decrease in prices of flat rolled products. But here again the reason is attributed to technological developments, which some—not all—New Dealers have damned as have labor politicians.

Demand is responding to business activity. It is not a normal "general" business activity. It is created by a grim cause—war. Price has had little or nothing to do with the demand. Nations at war either must have steel or they die. They can't haggle about price. Yet, foreign belligerents, like our own government, properly have not been subjected to price rises.

No argument has been made by the industry against reducing prices compatible with costs. Rather that policy has been pursued as a wholesome one. Reduction of prices has been most conspicuous in those units of the industry where technological developments have been greatest, notably in flat rolled lines, the products of the continuous mill. Yet some of the New Deal critics of steel prices join labor in the false cry of displacement of workers by improved processes. The industry's point is that, while reduced prices if they afford profits are desirable, they do not measure up in importance with normal profitable business activity and consumers' income. War business certainly is not normal and in the long range is not profitable.

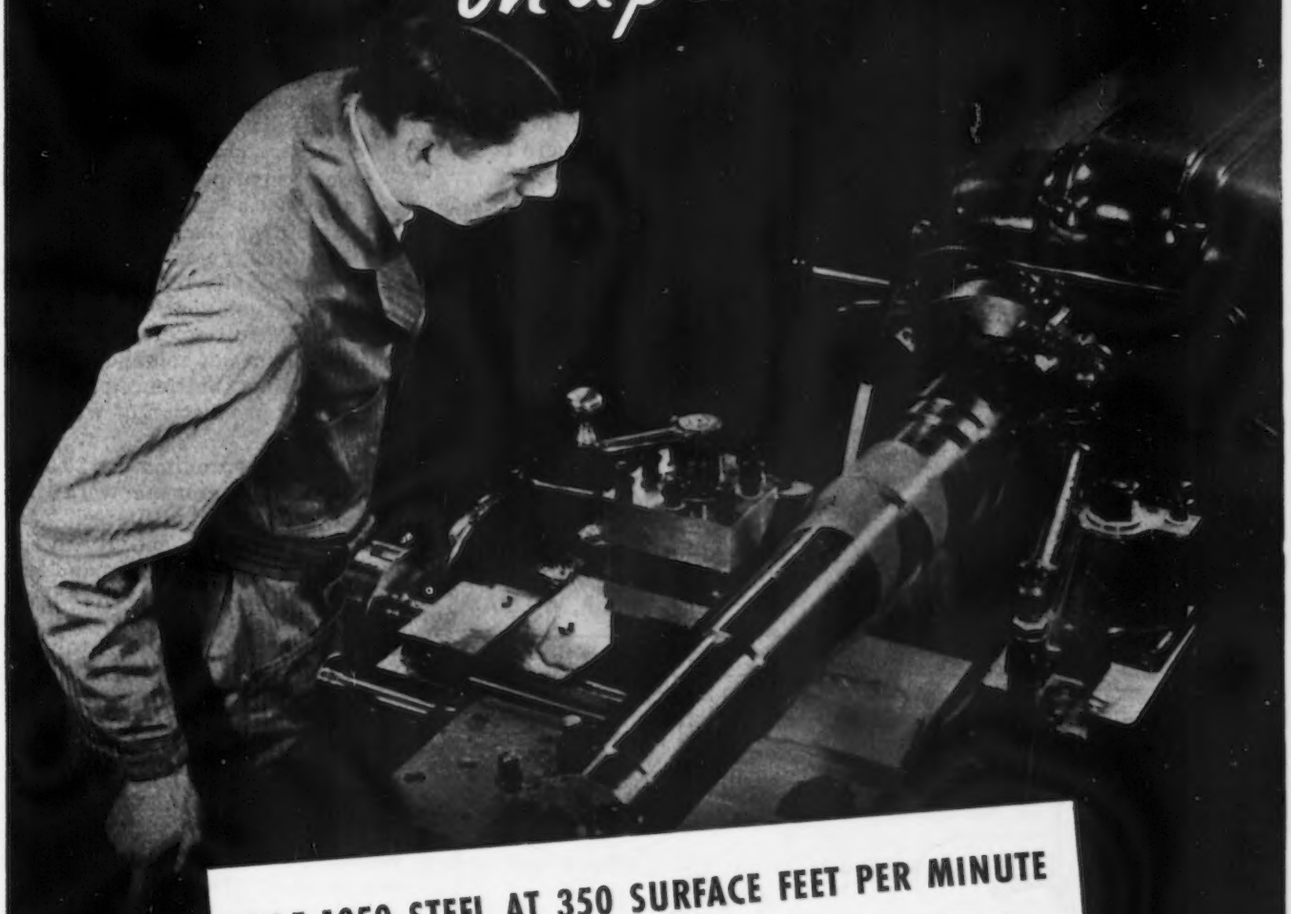
Future Generations Must Pay the Debt

THE New Deal continued synthetic attempts to bolster business activity and consumers prior to the enormous defense program. The turn now is to war business. It's necessary, yet it is an artificial, extremely costly undertaking.

↓ ↓

The unbridled extravagance and squandering of the New Deal in the past seven years had already saddled heavy hidden and visible taxes on the country, yet the government revenue never was within $3,000,000,000 of the outgo. That meant that future generations are to be burdened with taxes if the debt is to be paid. Now that the defense program has to be paid for if bankruptcy is to be avoided, additional enormous taxes, far beyond those now being prepared, are yet to come.

SUNOCO PUTS ACCURACY AND FINE FINISH *on a production basis*



Removing 35 cu. inches of metal a minute on an 18" x 54" American Pacemaker Multi-Production Lathe.

SAE 1050 STEEL AT 350 SURFACE FEET PER MINUTE

When this is the order for production there must be the closest coordination between machine... metal... tools... cutting lubricant ...and above all the mechanic.

That's why skilled mechanics throughout the metal working industry choose SUNOCO Emulsifying Cutting Oil, when it is necessary to take heavy cuts at high peripheral speeds with cemented carbide tools. They know the high heat absorbing and lubricating properties of Sunoco keep the work and tools cool... its washing action prevents chips from clogging... and produce more accurate work in less time.

Next time the production order looks tough take a tip from the leading machine tool builders. They know to save production time... tools and material... it pays to specify

SUNOCO
EMULSIFYING CUTTING OIL

Photograph Courtesy of American Tool Works Co.

SUN OILS

PETROLEUM PRODUCTS FOR ALL INDUSTRIES

"Profits" from military orders will vanish into thin air. Estimates are made that in the next six years national defense expenditures will amount to the staggering total of $37,000,000,000.

• Still on top of this the government handouts and subsidies will continue unabated. Since the third-term campaign is under way they probably will be increased. The New Deal doesn't mention "economy" or say anything about a "balanced budget" now. The election is the thing. Under the flimsy guise of "indispensability" Mr. Roosevelt is shattering all precedent and seeking what has been denied all preceding Presidents. Those who sneer at the idea that his reelection would mean dictatorship might well regret their attitude of mind.

But the immediate thing is to make the New Deal, if possible, halt its wild spending on other than essential needs and to at least try to put the domestic economy in the semblance of sanity.

Extravagant spending obviously is an outstanding cause that has destroyed confidence, the sparkplug of business, but as a vote-getter it is potent. As it is, handouts with subsidies for millions and an army of more than 1,000,000 on the cure payroll, giving beneficiaries a vested interest in the government, are the politically important thing, regardless of the debt.

Gone are the days of New Deal concern, except for lip service, over economy. The main thing is to remain in power, regardless of cost to taxpayers. Campaign oratory in 1932 lashed out at federal costs, which then consumed about 4 per cent of national income. Even before the defense program the cost had risen to 9.5 per cent and the deficits averaged more than $3,000,000,000 each year since the advent of the New Deal. Yet there is gay indifference to expenditures.

↓ ↓

Washington

Showing that present commercial needs for paints, lacquers and other materials can be met by recovery from by-product coke ovens, E. R. Stettinius, Jr., in charge of the Industrial Materials Division of the National Defense Advisory Commission, has announced that potential supplies of toluene used in the highly important explosive TNT are adequate for all anticipated United States requirements. Mr. Stettinius' announcement was made as he released a study just completed in conjunction with the Army and Navy.

Experimental production of toluene from petroleum, it was said, indicates that this is an entirely practical source of supply. It was stated that large volumes can be made available in a relatively short time by the installation of additional recovery equipment. Plans are being made to provide stock piles of toluene to prevent a temporary shortage.

Our present position is in sharp contrast with the situation prevailing during the World War, the report stated, as at that time this country had only limited facilities for recovering coal tar products and the difficulties of getting adequate amounts of toluene resulted in a serious bottleneck in our emergency production of war supplies.

"In 1939, approximately 25,000,000 gallons of toluene were produced in the United States," said the report. "Since activity in the steel industry began to expand last fall, production of toluene from coke-ovens has increased. Present capacity for the output of toluene by water gas plants and coke-ovens is substantially in excess of current requirements, and a very large productive capacity can be made available by the petroleum industry with little difficulty.

"Two methods of getting by-product toluene from petroleum can be used. The more important is the recovery of toluene in the production of high-octane gasoline used in aircraft. It is estimated that supplies can be made available by this method at costs comparable to those prevailing at coke-ovens. The second and more costly method, which could be used, if emergency conditions required it, involves the 'cracking' of other petroleum products.

"Experimental production of toluene from petroleum has indicated that this is an entirely practical source of supply and that large volumes could be made available in a relatively short time by the installation of additional recovery equipment."

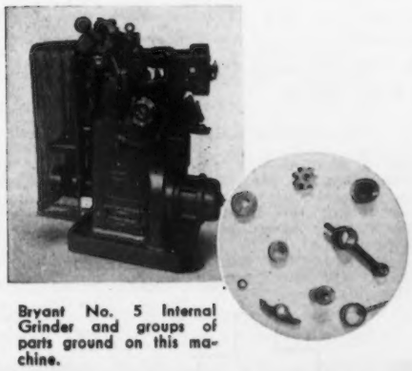
THE BULL OF THE WOODS — BY J. R. WILLIAMS

EMPLOYEES ONLY
THAT'S EASY ON A BOSS, TH' WAY YOU GET FIRED THESE DAYS.... JUST A LITTLE NOTE IN YOUR PAY ENVELOPE AN' NO MESS ER ARGUMENT!
THAT GUY MUST HAVE EXPECTED IT, ER HE WOULDN'T HAVE LOOKED AT HIS CHECK TILL HE WENT TO SPEND IT... I'D BETTER LOOK! I'M GETTIN' CARELESS!
OH, I WATCH THAT PRETTY CLOSE..... I HAND MY WIFE MY PAY ENVELOPE AND SHE CASHES IT AT TH' STORE.... AND I DON'T WANT TH' BUTCHER TELLIN' HER THAT I'M FIRED!
THE PAPER KICK
J.R.WILLIAMS 9-12
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.

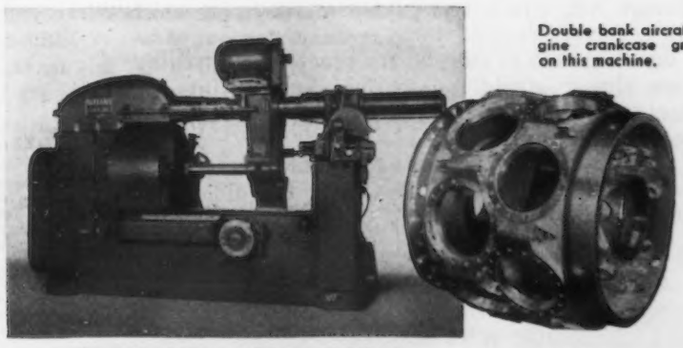
Very Small
OR
Very Large

GRIND THEM ON A BRYANT

THE Bryant line of Internal Grinders is suitable for grinding each size bore that may be required by the manufacturer's design. Any of these machines will produce finish and accuracy to satisfy every need. Straight and taper holes may be ground with standard equipment either separately or in combination with each other. Standard machines may be easily arranged to grind cams and out-of-round holes by adding the cam attachment.



Bryant No. 5 Internal Grinder and groups of parts ground on this machine.



Double bank aircraft engine crankcase ground on this machine.

Bryant No. 24 Internal Grinder with 36" swing.

BRYANT CHUCKING GRINDER CO., Springfield, Vt.

Fatigue Cracks

BY A.H.DIX

Oops! Sorry

• • • M. W. (E. C. Atkins & Co.) Dallas, writes:

> *"See item headed, 'Bell Ringer,' page 52, Aug. 29th issue. So help me, I can't find an* IRON AGE *for Aug. 3."*

Sorry. We meant Aug. 1. In the same item *blitzkrieg* was spelled *blitzkreig*. We cleaned our typewriter keys with alcohol the other day and can't do a thing with them. The only thing we have the proofroom to thank for is that it won't let us get by with one "l" in *Willkie*.

Four o'Clock Homer

• • • Errorless proofreading is, of course, as rare as a perfect fielding score for a shortstop throughout a world's series. Along about four in the afternoon the proofreader gets fed up with reversing the "i's" and "e's" in *receipt* and *siege*, giving *data* a plural predicate, indicating that *coincidently* is not a word, and so on, and begins thinking about tonight's pinochle game. Then you get something like this, clipped from a Cleveland newspaper by our espionage agent in that city:

> W. 58, 3429, 7-rm. single, 4 rms. and bath down, 3 and toilet pu; furnace.

Our agent remarks, "Probably one of those chemical jobs."

Test Your Powers of Observation

• • • As a practical demonstration of the concentration demanded of proofreaders, see how close, on first reading, you can come to counting the number of F's in the following:

> FEDERAL FUSES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS.

The answer is at the end of this page. If you come within two of the correct total consider yourself unusually acute.

Mique Gives Thanques

• • • One of the editors has dug up a copy of the Espionage Act, which was passed in 1917 and which is still in force. We read it and it scared h--l out of us. It is broad enough to jug you for practically anything. We are almost afraid to mention that reprints are available of Col. H. A. Toulmin, Jr.'s, seven-shot critique of defense measures.

Of course you can play safe by running a page like this as the Mother's Cake & Cookie Co. did in the Oakland (Calif.) *Tribune*:

> THANK GOD . . . from whom all blessings flow . . . for OUR DEFENSE PROGRAM . . .
>
> *MOTHER'S CAKE & COOKIE CO.*
>
> *MIQUE WHEATLEY, PRES.*

They Put It in Writing

• • • In the Coolidge era every trade paper advertising salesman went out armed with a sheaf of letters from loving readers. It was standard equipment, like a razor in Harlem. For years testimonial letters cast their space-selling rays and then went into a sudden eclipse from which they have never emerged. No one knows the reason, but those in the know suspect that it was because advertisers began to wonder, with good reason, whether all the love letters were sincere and spontaneous.

The synthetic love letter, being composed by an expert was, of course, far more credible than the genuine epistolary pat on the back. The expert would have been ashamed to turn out, for example, such a naive confession of affection as this one just sent us by a tool and die shop:

> *"There is only one magazine we really look forward to receiving each week—and that is yours. We don't miss a thing in it. Possibly you would be interested in knowing that your ads are responsible for much of the equipment in our shop."*

We get so many of them these days that even the editors say, "Ho hum," when we show them a stack of love letters, but we continue to tie them in blue ribbon and file them in the hope that some day somebody will ask, "How do you know they really care?"

Good Timing

> Nature has given us a whole series of unsinkable aircraft carriers in the form of . . . islands and promontories scattered along our coasts from a few miles to a thousand miles at sea . . . These bases should be fortified, and held and controlled by the United States as a matter of elementary salvation.—*Col. H. A. Toulmin, Jr., in* THE IRON AGE *issue of Aug. 1, 1940.*

> This government has acquired the right to lease naval and air bases in Newfoundland and in the islands of Bermuda, the Bahamas, Jamaica, St. Lucia, Trinidad . . . The value . . . of these outposts of security is beyond calculation.—*From the President's message to Congress, Sept. 3, 1940.*

Rhymer's Heaven

• • • One of our men called the other day on the Couse Laboratories, Newark, N. J., pronounced to rhyme with "spouse." "May I see Mr. Couse?" he asked. "He's out," he was told, "but Mr. House is in.' He saw Mr. House and remarked on the similarity of names. "Yes," said Mr. House, "and, furthermore, both of us come from Touse, New Mexico."

Hiatus

• • • A name that fascinates us is that of the author of the article on spectrographic analysis of lead, in last week's issue—J. N. Mrgudich of the University of Illinois. A syllable without a vowel vaguely baffles us, and we are all for throwing one in arbitrarily. Otherwise the reader is apt to start wondering how to pronounce the name, and continue wondering as he reads the article. Then when he gets to the end of it he discovers he has been reading only with his eyes and not with his mind, and has to start all over again.

But Mr. Mrgudich has at least one vowel to his name, and is thereby one up on a certain executive connected with a Pennsylvania plant, who has none. We have in mind a Mr. Smrz.

Puzzle

A farmer owns a field shaped as in the diagram. All the sides are of equal length. He hires a carpenter to build a fence around the field. In giving instructions the farmer errs and instead of ordering the number of linear feet, he tells the carpenter the number of square feet. The carpenter, however, buys that number of linear feet and finds it is just the correct amount to fence the field. What is the length of each side? What is the total length of the fence, and what is the area of the field?

There are six F's in the proofreading test.

You Pay the Same for Power--Delivered or Dissipated!

Mr. Dreis and Mr. Cashman Discuss Power for Pressing

Why Dreis & Krump Mfg. Company Engineers Installed Dodge Power Drive on their Presses

Huge presses manufactured by Dreis & Krump Mfg. Company, Chicago, serve many branches of industry by bending steel sheets and plates to various shapes — Necessarily these presses are rugged and require *power drives* no less sturdy and equally reliable — Dodge Units get the call — The above press includes a Dodge Diamond "D" Friction Clutch Flywheel — Dodge "D-V" Belt Drive and Dodge Bearings. Walter Dreis, President, discusses Dodge Drives with L. J. Cashman, Dodge Sales Engineer.

Mr. Dreis: Why do you suggest Dodge Diamond "D" Friction Clutch Flywheel for our press?

Mr. Cashman: Because it is powerful —handles overloads—it is perfectly balanced — completely enclosed — compact and self-locking.

Mr. Dreis: All right — but how will it take starting loads?

Mr. Cashman: Ample safety factor has been built into this clutch to permit starting loads 100 percent higher than normal rating.

Mr. Dreis: Why use Dodge Timken Roller Bearing in hub of flywheel?

Mr. Cashman: Because you have a heavy shockload at high speed — which requires a heavy duty — true running — perfectly sealed — trouble-free bearing.

Mr. Dreis: Fine — but why your "D-V" Belt on this unit?

Mr. Cashman: Because of its "Matched Quality" — grooves are smooth, their diameters are uniform—each belt "pulls" its share of the load — Concave side walls of the belt form perfect straight surface in contact with the groove, assuring long life.

Mr. Dreis: O. K. I want a dependable power drive — so Dodge it will be.

Dodge they are and have been for 15 years. Dodge Power Transmission Units have enviable performance records — For built-in production machine application—or for power transmission — Depend on Dodge.

DODGE MANUFACTURING CORPORATION
MISHAWAKA, INDIANA, U. S. A.

• We favor adequate preparedness for national defense, and recommend enlistment in the U. S. Army to eligible young men.

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DODGE
MISHAWAKA
Power Transmission

THE RIGHT DRIVE -- FOR EVERY JOB

News of Industry . . .

Ore Movement 3rd Heaviest Since '28

Cleveland

• • • **This season the** vessel movement of Lake Superior iron ore from upper lake ports will rank third highest of the last twelve years, exceeded only by 1929, when 65,204,600 tons were brought down, and 1937, when 62,598,836 tons were moved.

While reaching the 60,000,000-ton mark in shipments this season is still possible if full speed prevails and the weather remains fair, some observers predict 58,000,000 tons as more logical to expect. At any rate, an adequate supply for the winter seems assured even though consumption continues its present high pace of around 5,500,000 tons per month. As can be expected in all types of industries the nation over, shortages of certain types and jams at individual plants would not be unexpected.

Available figures show a number of other interesting facts: (1) Very close proximity has been maintained this year between consumption and shipments, as the accompanying table indicates; (2) The amount of ore on hand at furnaces and Lake Erie docks next May 1 will be unusually low, possibly as low as 13,000,000 tons, if consumption holds up; and (3) The movement of Lake Superior ore this season to the eastern seaboard is not showing the gain which was expected in view of current world conditions.

The peak of the ore shipping season from the standpoint of hauling large monthly ore tonnages is now behind shippers. Full vessel draft can be loaded only during 13 days of September, as upon Sept. 16 and Nov. 1 draft regulations are reduced about 8 in. each time. Nov. 1 to 15 is considered quitting time, due to weather conditions. The highest November tonnage moved in recent history was 5,472,605 tons in

(*Continued on page 71*)

THIS VIEW in the San Diego naval base recently shows World War destroyers, some of which have been recommissioned, put back into service and in some instances handed over to the British in exchange for leases on British islands in the Atlantic. (By INS.)

IRON ORE SUPPLIES
Gross Tons (000 Omitted)

Year	Consumed in First 8 Months	Vessel Shipments to Sept. 1	On Hand Sept. 1*	Consumed in Final 4 Months	Vessel Shipments in Final 4 Months	Season Total Vessel Movement	On Hand at End of Year*
1929	44,140	43,718	33,831	19,505	21,487	65,205	37,646
1937	39,983	45,438	35,343	14,013	17,160	62,599	40,775
1940	38,327†	38,237	33,200†	....	....	....	....

*At furnaces and docks.
†August consumption estimated at 5,500,000 tons.
All figures from Lake Superior Iron Ore Association, Cleveland.
Vessel movement from Upper Lake ports.

1939 when the Great Lakes carriers ran until Nov. 15.

In an emergency, at high cost, it is possible to bring ore to lower lake furnaces by all-rail. Early this year one such shipment was made, but this method of bringing down ore has been rare. The all-rail movement generally is confined from mines to upper lake consuming furnaces.

August shipments of 10,534,431 gross tons proved below expectations, with three Lake Superior docks failing to equal their July loadings. Both docks at Marquette were lower, but the greatest drop was at Two Harbors, which was off around 300,000 tons from July.

A very heavy coal movement up the lakes this season is one reason assigned for delay in running time. Another is the prevalence of heavy fogs.

SAE Forms Aeronautical Defense Standards Board

• • • **Creation of the** SAE Aeronautical Standards Board for National Defense and the appointment of Theodore P. Wright, international authority on aircraft design and construction, as its chairman, has just been announced by John A. C. Warner, general manager of the Society of Automotive Engineers.

Steel Fabricators Will Hold Convention Oct. 14

Fabricators of structural steel throughout the United States have been called to annual convention the week of Oct. 14 by the American Institute of Steel Construction. The meeting will be held Oct. 15-18 at the Greenbrier Hotel, White Sulphur Springs, W. Va. National defense will be the theme of the meeting.

Briggs Cleveland Plant Will Resume

Cleveland

• • • **Manufacturing operations** are expected to begin in four weeks at the Briggs Mfg. Co. factory here, idle since 1932. A license was recently obtained by the Briggs Mfg. Co. permitting it to operate in Ohio under the Hagermeyer patented casting process. Part of the plant's operation is expected to be connected with the airplane industry.

Coming Events

Sept. 18 to 20—National Industrial Advertisers Association, annual conference, Detroit.

Sept. 18 to 20—Grinding Wheel Manufacturers Association, Abrasive Grain Association, meeting, Osterville, Mass.

Sept. 19 to 20—Concrete Reinforcing Steel Institute, semi-annual meeting, Skytop, Pa.

Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.

Oct. 2 to 5—Electrochemical Society, Inc., fall meeting, Ottawa, Canada.

Oct. 7 to 11—Twenty-ninth National Safety Congress and Exposition, Chicago.

Oct. 13 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.

Oct. 16—Porcelain Enamel Institute, fifth annual forum, Urbana, Ill.

Oct. 17 to 19—American Society of Tool Engineers, semi-annual meeting, Cincinnati.

Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.

Oct. 21 to 25—National Metal Congress, Cleveland.

Oct. 25 to 26—Foundry Equipment Manufacturers Association, annual meeting, Hot Springs, Va.

Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

A.I.M.M. in Utah For 153rd Meeting

• • • **More than a thousand** members of the American Institute of Mining and Metallurgical Engineers assembled in Salt Lake City, Utah, for the 153rd meeting of the institute, Sept. 10-13, to discuss the latest methods of mining and treating ores and the sources and availability of the strategic minerals needed for U. S. defense.

The Utah Section of the institute is host at the meeting. D. D. Moffat, vice-president Utah Copper Co., is general chairman. The first session was a luncheon at Hotel Utah. On the technical program are two papers on the Climax-Molybdenum field—the newest large mining enterprise in the Colorado area. Another paper on the "Future of the Lead-Zinc Industry," by Clinton H. Crane, president of the St. Joseph Lead Co., pointed out the significance of this industry in our defense and industrial economy.

The meeting will close Friday evening with a banquet at Hotel Utah, at which Cornelius F. Kelley, president of the Anaconda Copper Mining Co., will be the principal speaker. D. D. Moffat, vice-president of Utah Copper Co., will act as toastmaster.

Sparks-Simplex Company Organized at Norwalk

• • • **The Sparks-Simplex** Machinery Co. has been organized at Norwalk, Conn. by C. Nelson Sparks, former mayor of Akron, Ohio, and Stanley W. Sparks, for many years a consulting engineer for the Bridgeport Brass Co. The company will design a simplified shell lathe and equipment for gun manufacture, acting in a purely engineering capacity.

1163 Defense Workers End Training Course

Chicago

• • • **Last week 1163 men** were graduated from a technical high school here in the first of a series of six-week courses to develop skilled workers needed for the federal defense program. Many of these students have already found jobs in private industry, and others will go into the Army, Navy or Air Corps.

July Scrap Exports to Japan Rise 100%, Half of All Exports Are From East Coast

• • • **Exports of scrap** iron and steel to Japan in July showed an increase of over 100 per cent above the June shipments, with about 43 per cent of the exports to that country originating at ports on the Atlantic seaboard, 30 per cent at west coast ports and 20 per cent at Gulf ports, a study of the latest Department of Commerce data indicates. July exports to United Kingdom decreased slightly, but were still substantially in excess of the movement to Japan.

July exports to Japan were 113,926 tons, as compared with 56,776 tons in June, while shipments to United Kingdom in July were 140,365 tons against 155,364 tons in the preceding month. Exports to Canada, mostly from the Great Lakes area, were 57,104 tons in July and 55,317 tons in June. No shipments were made to Italy in July, but 11,540 tons were shipped to Spain in that month. Exports to all countries in July totaled 326,546 tons, valued at $5,435,498. United Kingdom, Japan and Canada accounted for 95 per cent of the total.

Scrap Exports to Principal Buyers

(Per Cent of Total Scrap Exports)

	July	June	Aver. for 1939
United Kingdom	43	49	14
Japan	35	18	57
Canada	17	17	5
Italy	..	6	12
Others	5	10	12

A little more than half of all July exports were shipped from customs areas located on the east coast and 14 per cent was shipped from Gulf ports. The West Coast's share was 11 per cent, while the Great Lakes area contributed 10 per cent.

The New York customs area, which includes Albany, N. Y., was the largest exporting center in July, accounting for 20 per cent of all shipments. Galveston was second largest with 14 per cent, supplanting the Massachusetts area which was in second place in June. The Michigan customs area, due entirely to Canadian shipments, was third most important point of origin with 7 per cent.

July Scrap Exports (Tons)

↓ From / → To	United Kingdom	Canada	Japan	Spain	Total
Maine and New Hampshire	9,600	407	.....	.....	10,007
Massachusetts	5,924	7,979	60	.....	13,963
Rhode Island	.....	.....	5,457	.....	5,457
Buffalo	.....	6,435	.....	.....	6,435
New York	39,227	.....	25,811	.....	65,038
Philadelphia	5,336	.....	.....	4,279	9,615
Virginia	15,273	.....	.....	.....	15,273
North Carolina	4,360	.....	5,837	.....	10,197
Georgia	9,310	.....	3,446	.....	12,756
Florida	5,892	.....	8,751	2,887	17,530
Mobile	7,827	.....	1,911	.....	9,738
New Orleans	5,431	.....	7,704	.....	13,135
Sabine	4,268	.....	.....	.....	4,268
Galveston	27,917	.....	13,086	4,374	45,377
Los Angeles	.....	.....	5,192	.....	5,192
San Francisco	.....	.....	5,698	.....	5,698
Oregon	.....	.....	18,856	.....	18,856
Washington	.....	.....	5,752	.....	5,752
Duluth and Superior	.....	7,795	.....	.....	7,795
Wisconsin	.....	2,440	.....	.....	2,440
Michigan	.....	23,530	.....	.....	23,530
Puerto Rico	.....	.....	3,118	.....	3,118
Total, Tons†	140,365	57,104	113,926	11,540	326,546*
Total, Value†	$2,407,685	$812,278	$1,968,250	$194,095	$5,435,498*

Table above covers shipments by principal customs areas to the larger foreign buyers.
†All exports, including those from minor customs areas not included in the tabulation.
*Covers all shipments to all countries from all customs areas.

LaSalle Steel Expands Plant at Hammond

Chicago

• • • **LaSalle Steel Co.**, Hammond, Ind., is getting underway on an expansion program consisting of a new machine shop building and additions to two of the existing plant structures. The new machine shop building is to be a two-story structure, the first floor, which will contain the shop, measuring 70 x 40 ft. On the second floor, which is to be 100 x 40 ft. in area, new lockers and washroom facilities for employees will be erected and a plant restaurant will be constructed. An 8200 sq. ft. addition to the present heat treating building is planned and a large heat treating furnace designed by LaSalle's own engineers, will approximately double the present heat treating capacity.

Industrial House Organ Editors Hold Convention

St. Louis

The first national convention of industrial editors will meet in St. Louis on Oct. 13 at the Hotel De-Soto. Five associations, representing five different sections of the country, will convene for the three day convention. The members of these five associations represent the majority of editors of house organs published by the industrial corporations of this country. Howard A. Marple, vice-president of the American Association of Industrial Editors, is general chairman.

Union Drawn Steel At Gary To Be Enlarged

Gary, Ind.

• • • **Construction is expected** to begin shortly on an addition to the plant here of the Union Drawn Steel division of Republic Steel Corp. Two structures, one measuring 308 x 55 ft. and the other 146 x 144 ft. will be erected, increasing present plant area by approximately 50 per cent. The prime purpose of the expansion is to provide sorely needed warehouse facilities. Two new annealing furnaces, one bar and one coil, have been ordered.

Output of Steel Is Third Highest

Output of 6,033,037 net tons of open hearth and bessemer steel ingots during August represented the third largest monthly tonnage in the history of the steel industry, according to the monthly report of the American Iron and Steel Institute.

The August total ranked behind only the output in October and November of last year, and was within 2 per cent of the record total of 6,147,783 tons produced in November.

Production in August was 8 per cent over the July figure of 5,595,070 net tons, and was more than 40 per cent greater than in August of last year when output amounted to 4,241,994 tons.

During the past month the steel industry operated at an average of 89.72 per cent of capacity, as against 83.40 per cent in July, and 62.62 per cent in August, 1939.

Steel ingot production averaged 1,361,859 tons a week in August, compared with 1,265,853 tons a week in July, and with 957,561 tons a week in August a year ago.

1940	Reported Production (Net Tons) Open-Hearth	Bessemer	Calculated Production All Companies Monthly	Weekly	Number of Weeks	Per Cent of Capacity
January	5,262,760	285,714	5,655,315	1,276,595	4.43	84.11
February	4,113,446	205,527	4,409,035	1,064,984	4.14	70.16
March	3,990,510	191,559	4,264,755	962,699	4.43	63.42
1st Quarter	13,369,285	682,800	14,329,105	1,102,239	13.00	72.62
April	3,721,264	176,335	3,974,706	926,505	4.29	62.04
May	4,489,665	253,709	4,841,403	1,092 867	4.43	72.00
June	5,122,390	304,381	5,532,910	1,289.723	4.29	84.97
2nd Quarter	13,333,319	739.425	14,349,019	1,102,922	13.01	72.66
1st 6 Months	26,702,604	1,422,225	28,678,124	1 102,381	26.01	72.64
July	5,165,672	322,3[illegible]2	5,595,070	1,265,853	4.42	83.40
August	5,548,397	369,674	6,033,037	1,361,859	4.43	89.72

Dr. S. L. Hoyt Will Give Campbell Memorial Lecture

Cleveland

Dr. S. L. Hoyt, of Battelle Memorial Institute, Columbus, Ohio, has been selected to deliver the 1940 Edward DeMille Campbell memorial lecture, one of the outstanding features at the annual National Metal Congress and Exposition here.

The lecture will be presented at the Wednesday morning session of the American Society for Metals, Oct. 23. Dr. Hoyt's topic has not been announced yet, but will deal with modern metallurgy.

Another announcement of importance is that Maxwell Gensamer, of Carnegie Institute of Technology, has been selected to prepare and deliver four educational lectures Oct. 21, 22, 23 and 24, each to be given at 5 P. M. at the American Society for Metals sessions. Mr. Gensamer's four lectures will be on "Strength of Metals Under Combined Stresses."

Another Thing you can count on

The thoroughly modern plant and experienced personnel of the former Great Lakes Forge Company have become an integral part of AMFORGE.

You can count on the facilities of this great plant to fill your Drop Forging requirements with the same skill and economy which AMFORGE achieves in producing Upset Forgings.

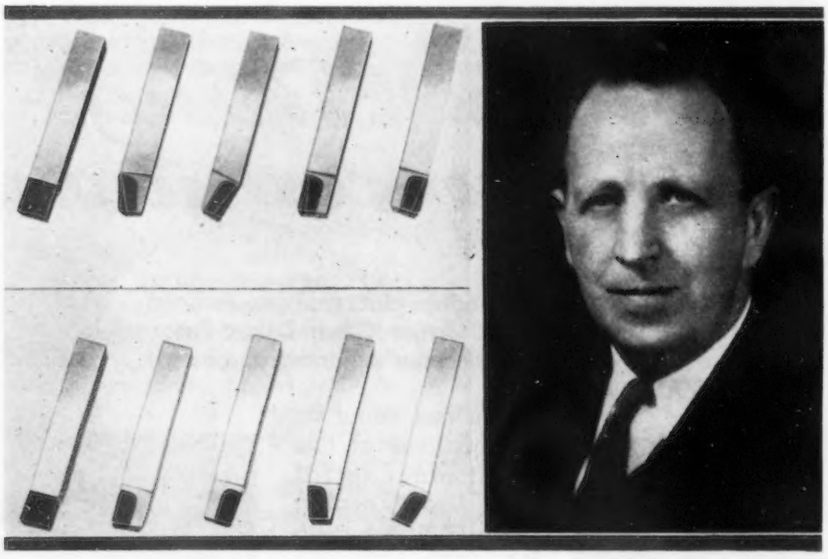
For a complete forging service, conducted under highest standards of quality, send us your sample parts or finished dimensioned prints and our engineers will promptly check them over and submit recommendations and prices on the quantities needed—without obligation of course. Avail yourself of this service.

AMERICAN FORGE DIVISION
OF THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY
2621 SOUTH HOYNE AVENUE, CHICAGO, ILLINOIS

AM FORGE
DROP AND UPSET FORGINGS

Carboloy Gives More Details on New Lower Priced Carbide Tools

• • • **Following the announcement** last week (THE IRON AGE, Sept. 5, p. 83) of a standardized line of carbide tipped cutting tools at new, low prices, the Carboloy Co., Inc., Detroit, has issued further details concerning these tools. In addition to covering, in five standard styles and three grades, the vast majority of all turning, boring and facing applications in industry, the new standard tools are also capable of simple conversion by the purchaser into hundreds of forms of special tools at low cost.



W. G. Robbins, above, is president of the Carboloy Co., Inc., which recently announced its new standard tool line, pictured here. Steel-cutting tools with copper colored shanks. Left to right: styles 1, 14, 13, 7 and 4. Below: aluminum color distinguishes tools for machining cast iron. Left to right: styles 1, 7, 4, 14 and 13.

The illustration shows two complete sets of tools—one for cutting steel, the other for cast iron. Ready differentiation between tools designed for steel cutting and those intended for machining of cast iron is provided by coloring of the shanks of the tools—copper colored for steel cutting, aluminum color for cast iron.

Introduction of a standard line of Carboloy tools for machining of steel has been facilitated through the development of a general-purpose grade of Carboloy for steel cutting designated as 78 B. Tools of this grade will stand more abuse than those of the 78 grade, and have greater resistance to abrasion than the 78 A grade. They are designed to take cuts up to ½ in. deep, and feeds up to 0.030 in. For machining of cast iron, the standard tools are available in two optional grades.

Following are prices of the new standard tool line, all styles in each size being priced identically, except style No. 1. Prices for the latter vary slightly from those listed below:

	PRICE		
	In lots of:		50 or
Shank Size	1	2 to 4	Over
5/16 x 5/16	$1.55	$1.30	$0.85
⅜ x ⅜	1.85	1.50	0.90
½ x ½	2.65	2.15	1.50
⅝ x ⅝	3.95	3.20	2.40
¾ x ¾	5.35	4.25	3.10
1 x 1	9.55	7.60	5.95
1¼ x 1¼	15.50	12.20	9.90
⅝ x 1¼	9.45	7.60	6.05
¾ x 1½	12.20	9.75	7.65

All styles are finish ground, ready for use, including even a grinding-in of a chip breaker on tools designed for steel cutting.

Inception of the expanded manufacturing program and economies resulting from greater production efficiencies in Carboloy's new million-dollar plant has also made possible, according to W. G. Robbins, Carboloy president, a further price reduction—the sixth since 1929—on cemented carbide metals, thereby also effecting price reductions on other Carboloy products, including special tools and tool bits, dies, wear resisting inserts, etc.

Availability of standard Carboloy round hole dies for drawing sizes of bar and tubing up to 3½ in. diameter, and improvements in construction in the larger series—R7 to R16—of standard drawing dies, are also announced by the company. Tendency to use cemented carbide dies for larger sizes of bars and tubing has led to the introduction of the R-18 type as a standard die. It is designed for drawing work ranging from 2¾ to 3½ in. diameter.

In addition, "cored" dies previously available only in the smaller—R1 to R6—series, are now also available in the series R7 through R10, for drawing fractional sizes of bar and tubing from 3/16 to ¾ in. in size. Rough drilled dies, available previously in these sizes are continued. Principal improvement in the larger series of dies, from the R-10 through the R-16, is a material increase in the size of the nib to provide a longer bearing for easier push start bar drawing and tube sinking.

J. & L. Unionists Strike Over Non-Paying Members

• • • **Two hundred tin** mill employees at Jones & Laughlin Steel Corp.'s Aliquippa plant staged a short-lived outlaw strike early last week when strikers refused to work with non-union workers or those delinquent in dues. Jones & Laughlin termed the strike a violation of contract and said union members had resorted to intimidation and coercion of fellow employees. This is the second instance of the kind, the first one having occurred more than a week ago when 14 union members at the company's pipe coupling shop refused to work with non-union employees.

The company's contract with the union does not call for either a closed shop or a check-off. It provides that there shall be no cessation of work in case of grievances.

Reich to Exploit Bulgarian Ores

Washington

• • • **Production of lead-zinc** ores in the Rhodope Mountains of Bulgaria by German interests is scheduled to begin soon, according to a report received from Consul Sydney B. Redecker, Frankfort-on-Main.

This enterprise, which will constitute the leading lead-zinc mining venture in the country, will have an annual output of about 100,000 metric tons of ore with a metal content of between 10,000 and 15,000 tons, chiefly lead, the report says. The concession for the exploitation of these important deposits was granted by the Bulgarian government to a mixed German-Bulgarian concern, the Pirin Co. This concern is reported to have an operating capital of 200 million leva (the Bulgarian official rate of a leva equals 1.2c.) and at present employs 800 workers. The ore will be concentrated at the mines and the concentrate shipped exclusively to Germany for further processing.

The report adds: "In recent times Bulgaria has been notably active in conducting prospecting and other work looking to the development of the national mineral resources, which hitherto have been neglected due largely to lack of adequate capital and the technical skill requisite for their exploitation.

"The outbreak of the present war, seriously curtailing Europe's imports of non-ferrous metals from overseas countries and creating an increased metal shortage in blockaded continental countries, has given an appreciable impetus to interest in Bulgarian mineral resources on the part of both Bulgaria itself and metal consuming countries, particularly Germany. As there are no blast furnaces in Bulgaria and only limited facilities for processing ores, the entire ore production is reduced abroad. In view of this situation and for the promotion of production of its own minerals, Bulgaria has granted the duty-free importation of metal ingots, bars, and sheets produced abroad from Bulgarian ores."

Germany is expected to obtain substantially augmented amounts of Finnish copper as a result of a trade agreement recently concluded between Finland and the Reich.

Although the terms of the agreement have not been published, reliable sources believe that future German-Finnish trade relations will be based upon an increasing exchange of Finnish metals, largely copper, for coal, a commodity which is now abundantly available in Germany.

While in recent years Germany has taken the great bulk of Finland's copper exports, it is believed that with an expansion of Finnish output it will be possible to appreciably increase such shipments.

Machinery Licked the Apes

SELDOM HAS the case for the machine been more ably told than in the advertisement reproduced below, originated by the Link Belt Co., Chicago, and also used by the Maran Printing Co., Baltimore. The IRON AGE reprints the advertisement as a "news picture."

After all . . .

IS MACHINERY A GOOD THING?

ONE THING SURE . the world of today wasn't made by hand.. it was made by machinery. If we had fought this thing out just with our hands, the apes would have licked us long ago.

In the beginning the only animal in the jungle who had sense enough to seize and use the materials and forces around him was MAN. And with this slight edge he has turned the rest of them into meat for his table, leather for his feet, and circuses for his amusement.

IT PAYS TO THINK! It pays to invent! It pays to seek the newer and better way! Don't do anything with your own two hands that you can do better with your BRAIN!

* * *

We hear a lot of talk these days about the evils of mechanization. Some say machines throw people out of work . . . that, because of machines, millions are unemployed . . . that we are being ground to death by the Frankenstein monster of steel which we, ourselves have built.

If this is true, then we ought to get out our sledge hammers and smash all this machinery to pieces.

But before we wreck, let's look at the facts . . . is or is not machinery a good thing?

The job of machinery is to end drudgery . . . and it's making headway particularly here in America where there is less backache than anywhere else in the world. If you doubt it, just take a trip to Europe. Machinery does not enslave . . . it emancipates! It doesn't empty pockets and stomachs and hearts . it fills them!

It releases women from soapsuds and washtubs and makes better sweethearts, sisters, daughters, wives and mothers out of them. It has lifted the farmer off a horse and put him on a tractor. And, as for the shopman, it has taught him how to drill a thousand holes right, in less time than it used to take him to drill one hole *wrong . . . and to get more money for it.*

"But how about the men these drill-presses displace"? Don't say "displace"... say *"promote."* Machinery has lifted these men into better jobs. They themselves will tell you so. They'll even go further . . . they'll tell you that, before machinery, anybody who would have dared to suggest a shorter day, a shorter hour week, and a bigger wage, would have been plain crazy.

The fact is that machinery has at last made it possible for the forgotten man to begin thinking in terms of daylight and fresh air and sunshine and LEISURE.

Is or is not that a bad thing?

Without machinery there could be no volume. Without volume, things would cost more and they wouldn't be anything like as good. Without better goods for less money, only the favored few could have modern homes and live modern, full-lunged lives.

This means that without better goods for less money there could be no mass markets . . . meaning no mass employment . . . meaning PERMANENT DEPRESSION!

Would we like to see THAT happen?

THE MARAN PRINTING COMPANY

21 WEST FAYETTE STREET. PHONES: CALVERT 5211-5212. BALTIMORE, MARYLAND

THIS COPYRIGHTED ADVERTISEMENT HAS BEEN REPRINTED BY PERMISSION OF THE LINK BELT COMPANY, CHICAGO—ITS ORIGINAL SPONSOR

Auto Prices in New Cars to Advance 5%

Detroit

• • • **First announcements** of 1941 automobile prices indicate that increases will be about 5 per cent, counting the one-half of 1 per cent increase in Federal tax which became effective July 1.

In many instances prices released so far show an increase of only 3 or 4 per cent over last year's prices but an analysis of the price lists reveals that the best sellers take the highest percentage increase. Convertible and sport type cars show the least increase and, in some cases, prices on these models have been dropped slightly.

The foregoing information is based on the general price information in the industry, because only two of the manufacturers have made any formal price announcements to date.

Buick has managed to hold the average price increase to 2.12 per cent but the average increase on the most popular cars in the Buick line (the Series 40) is 3.17 per cent. In the Buick line four models have been reduced in price and another body classification added at a price lower than its nearest counterpart last year.

Pontiac has published the advertised delivered prices, which include factory handling charge and the Federal tax at the new higher rate.

This price announcement gives a clear picture of the over-all effects of increased material cost and the increase in tax. On the two-door sedan (six cylinder) the delivered price is up from $833 to $874, a $41 increase being just under the 5 per cent mark. On the sedan-coupe models which sell in large volume, the price is up from $822 to $864, a $42 increase amounting to 5.1 per cent, including the tax.

Sloan to be Speaker at Falk Foundation Dinner

• • • **Alfred P. Sloan, Jr.,** chairman of General Motors Corp., will be the principal speaker at a dinner to be held Tuesday evening, Sept. 24, in the Schenley Hotel, Pittsburgh, to observe the 10th anniversary of the Maurice and Laura Falk Foundation. He will speak on "The Economic State of the Nation."

IN MANY WELDING schools in the U. S. students like these are receiving instructions on welding applications. Arc welding is playing an important Part in industries producing defense materials.

(Photo from Hobart Bros. Co., Troy, Ohio)

Foundry Equipment Men Convene Oct. 25

Cleveland

• • • **The annual meeting** of the Foundry Equipment Manufacturers' Association will be held at the Homestead, Hot Springs, Virginia, on Friday and Saturday, Oct. 25 and 26, according to A. J. Tuscany, executive secretary.

Questions to be considered by the meeting include: the relationship of the equipment manufacturers to the country's defense program; the situation dealing with taxes, amortization of new investments, and the like; the equipment manufacturer's situation with relation to sales and use taxes. Executive reports on present and future business will be called for.

P. J. Potter, of the Pangborn Corp., Hagerstown, Md., is president, and Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Pittsburgh, is vice-president.

Second Defense Workers' Class Started at Rockford

Rockford, Ill.

• • • **The first vocational** defense training program of the board of education having ended successfully Sept. 1, a second six weeks' course was started Sept. 9 with an enrollment of approximately 600 persons. These courses were formed to meet the need for additional skilled labor in the Rockford district. Classes will be offered in machine shop, machine trade, welding, drafting and blue print reading.

Allis-Chalmers Gets U. S. Contracts of $1,660,000

• • • **Allis-Chalmers Mfg.** Co., Milwaukee, has been awarded contracts for one hydraulic turbine for the Pickwick Landing dam project and two hydraulic turbines and two generators for the Wilson Dam project, which in the aggregate will amount to approximately $1,660,000. On all of these units the government has asked the promptest possible deliveries, in compliance with the President's emergency order speeding up war work.

McKAY ELECTRIC WELD TUBE MILLS

McKAY TUBE MILLS

Have been built and advertised in increasingly larger sizes to meet our customers' requirements. As the size of the machine increases, design of complete facilities for easy roll changeover becomes more important. This feature, as well as ease of adjustment, accessibility, rigidity of construction and speed synchronization, has been dealt with in accordance with modern engineering principles to meet our customers' particular conditions.

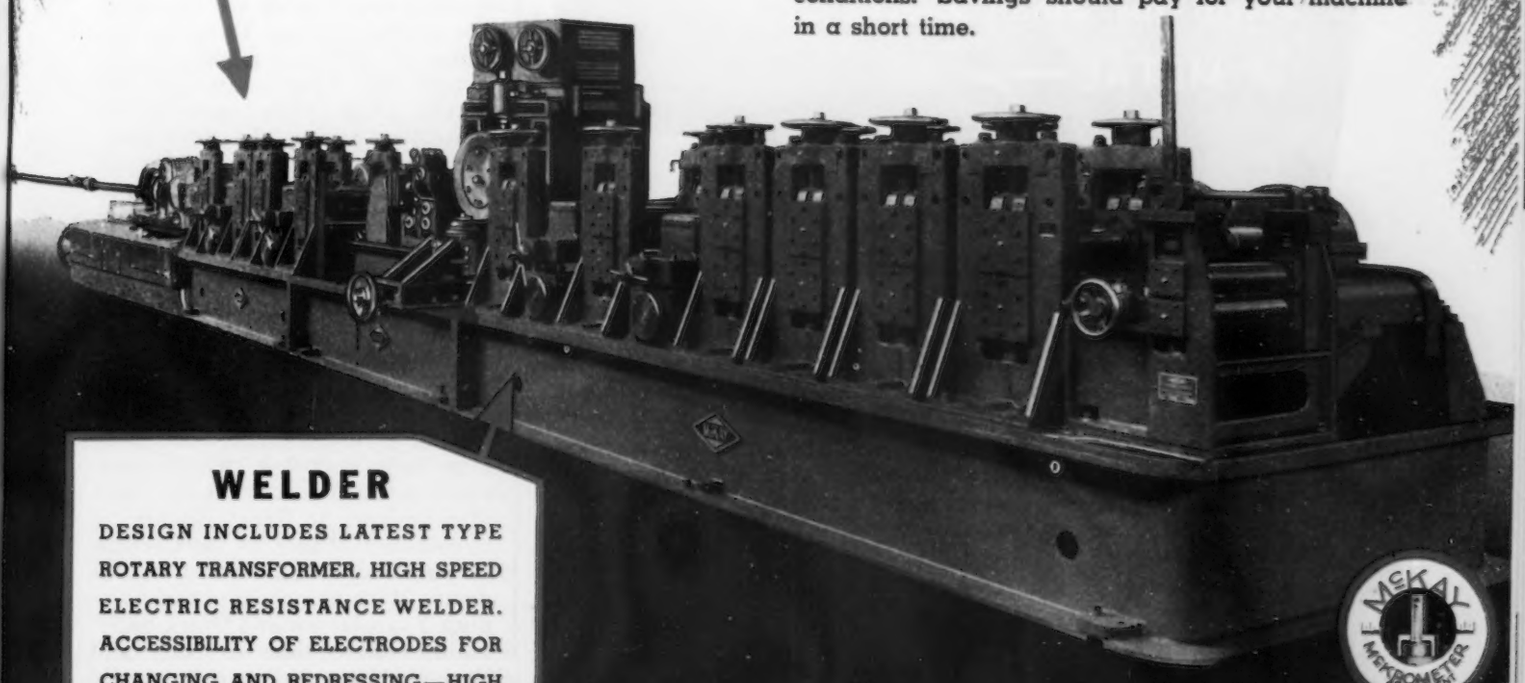
FORMING, SIZING AND STRAIGHTENING MACHINE

AS ILLUSTRATED IS DESIGNED TO PRODUCE MECHANICAL TUBING, IN A SIZE RANGE FROM 2⅜" OD TO 4½" OD — MAXIMUM WALL THICKNESS ¼".

CUTOFF

MACHINES AVAILABLE IN TYPES TO SUIT YOUR REQUIREMENTS.

CALL ON US FOR INFORMATION and prices on equipment to suit your particular conditions. Savings should pay for your machine in a short time.



WELDER

DESIGN INCLUDES LATEST TYPE ROTARY TRANSFORMER, HIGH SPEED ELECTRIC RESISTANCE WELDER. ACCESSIBILITY OF ELECTRODES FOR CHANGING AND REDRESSING—HIGH EFFICIENCY AND POWER FACTOR ARE CHARACTERISTICS INHERENT IN THIS CONSTRUCTION.

THE McKAY MACHINE CO.

Engineers and Manufacturers of
SHEET, TIN AND STRIP MILL EQUIPMENT
YOUNGSTOWN, OHIO

STOP LEAKAGE AND WASTE OF AIR POWER...

Hannifin "Packless" Air Control Valves have no packing, and no leakage or packing maintenance troubles. This simple disc-type design has the bronze disc ground and lapped to form a perfect seal with the seat, which is similarly finished. The smooth-acting, positive control of air operated equipment means better performance.

Made in 3-way and 4-way types, hand and foot operated, manifold, spring return, heavy duty rotary, electric and special models. Write for Valve Bulletin 34-A.

HANNIFIN MANUFACTURING COMPANY • 621-631 So. Kolmar Ave., Chicago, Ill.

ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS, ALL SIZES

HANNIFIN "Packless" AIR CONTROL VALVES

DOUBLE YOUR MACHINE TOOL PRODUCTION

With this Small Piece of METAL

How KENNAMETAL Can Help You Contribute to NATIONAL DEFENSE . . . .

Machine tools such as lathes, boring mills, shapers and planers, produce approximately twice as much work per day when equipped with tools to which a small piece of KENNAMETAL has been brazed on cutting edge. Tools tipped with KENNAMETAL (a new hard carbide material) machine extremely hard steel at speeds 2 to 6 times faster than High Speed Steel tools . . . remove 10 to 50 times more metal before tool must be resharpened . . . save operations by roughing and finishing in one cut.

KENNAMETAL-tipped tools can be quickly installed . . . and are equally effective on old or new machines. A National Emergency exists—write, wire or phone today for free survey to show how KENNAMETAL can double production of steel parts in your plant. No obligation—act now!

KENNAMETAL *Steel-Cutting* CARBIDE TOOLS

McKENNA METALS Co.
144 LLOYD AVENUE
LATROBE, PENNSYLVANIA, U.S.A.

Germany Holds Continental Ore

Lisbon, Portugal

• • • **Practically all Continental iron ore** supplies except the Spanish are in German control. The struggle for the Swedish iron ores, even after the German victory at Narvik is of secondary importance. Germany, being in possession of the Lorraine-Luxembourgian deposits, has curtailed considerably imports from Sweden, and the Groengesberg Trust had to slow down production. Of course neither Swedish ores nor charcoal iron nor steel of any kind can leave Sweden at present for Great Britain. The only European supplier for Great Britain is Spain, but exports are continuously declining. In May 73,400 tons (48-52 per cent Fe), in June 61,900 tons, in July 56,300 tons and in August probably below 45,000 tons. Germany continues to take small quantities of Bulgarian ores, but has stopped imports from Yugoslavia, which go wholly to the Hungarian iron industry.

The Italian industry is again getting scrap from France, although very small quantities, and is depending chiefly on Germany. The German scrap situation has improved very much, due to the victory over France, and she can supply Italy with considerable quantities during the next year. As a matter of fact, almost all scrap yards are full with material at present and imports from Spain have not yet been resumed, being unnecessary at present.

The French bauxite mines are wholly at the disposal of the German industry. The French mines supplied before June almost 60 per cent of the requirements of the British industry. The Norwegian aluminum industry which supplied in 1939 nearly 16,000 tons of aluminum to Great Britain, is to some extent idle, as the German output exceeds present requirements. With no possibility of shipping Yugoslavian and Greek bauxite elsewhere than to Italy and Germany, the Axis controls now 100 per cent of the aluminum raw materials in Europe.

By the trade agreement with Turkey of June 10, Germany se-

cured 50 per cent of the Turkish chromium ore production and by the supplement of July 17 took also the remainder. Through the Norwegian production, vanadium is also abundant and the nickel output of Petsamo, Finland, goes 100 per cent at present to Germany. Not so good is the situation as regards molybdenum, titanium and cobalt, but supplies of manganese are abundant.

The French steel industry in non-occupied territory faces a very sharp shortage of raw material. Chiefly situated in the Alps departments, most of the works have run out of their stocks of pig iron and steel and are working short hours.

Russia's buying program for the commercial year, October to September, 1941, includes some 1.7 million tons of finished and semi-finished steel, much of it special products. Most of this will be bought in Germany, and a great part supplied by the Bohemian-Moravian industry.

Britain Expanding Output of Iron Ore

London

• • • A substantial rise in the output of iron ore from the United Kingdom mines has taken place since August, 1939. In some cases the increase has been as much as 60 per cent over last year's level, this tendency being especially noticeable from mines in the Midland areas.

The government regards the increase as gratifying in view of the lack of imports of ore from Sweden and French North Africa. Imports derived from the United States and Newfoundland—both in the form of scrap and ore—continue to be available in the required quantities.

Allis-Chalmers Gives Increases to 730 Workers

La Porte, Ind.

• • • An increase in the minimum wage scale for about 730 employees is provided in a new contract signed by the Allis-Chalmers Mfg. Co. and the Farm Equipment Workers CIO union which succeeded an independent union.

● The New York, Susquehanna & Western Railroad recently placed two of these new, 80-passenger, self-propelled railcars in commutation service. Under the floor, a 290 hp. engine is mounted and the power is supplied direct to the axle through a Twin Disc Hydraulic Torque Converter.

ADVANTAGES: The Twin Disc Hydraulic Torque Converter makes the compact, light weight power plant practical because it greatly increases the engine's torque, eliminating starting jars and jerks and assuring a smooth, easy roll from a standing start . . . quick acceleration and a rapid, effortless shift into direct drive for the top speed.

Twin Disc Torque Converters lend themselves to the widest variety of heavy-duty industrial applications . . . locomotive cranes, hoists, oil well drilling rigs, logging donkeys and yarders. For complete description, ask for Bulletin No. 119.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

Torque Converter | Machine Tool Clutch | Power Take-off | Heavy-Duty Clutch

TWIN DISC CLUTCH CO. • 1370 RACINE STREET • RACINE, WISCONSIN

A.S.M.'s Chicago Chapter Will Hear J. R. Vilella

Chicago

• • • **Metallographic** technique was to be discussed at a meeting of the Chicago chapter of the American Society for Metals on Thursday evening, Sept. 12, by J. R. Vilella, research metallurgist for United States Steel Corp., Kearny, N. J. Mr. Vilella will demonstrate the extent to which the appearance of a microstructure is affected by polishing, etching and the proper and improper use of the microscope. Recent developments in metallography such as electrolytic polishing, and the use of lead laps as a substitute for emery papers, will also be discussed. The potentialities and limitations of the modern metallurgical microscope will be emphasized by Mr. Vilella throughout this talk.

The next meeting of the Chicago chapter of the A.S.M. will be held Thursday, Oct. 10, and will consist of a discussion of "Aircraft Metallurgy" by Richard R. Kennedy, metallurgist, of the Materiel Division of the Air Corps, Wright Field, Dayton, Ohio.

J. & L. Gets Bessemer Flame Control Patent

Pittsburgh

• • • **Jones & Laughlin Steel Corp. has been granted patents for manufacture of steel by their Bessemer Flame Control process which is a method of controlling the end-point of the Bessemer blow by an arrangement of photoelectric cells. That eliminates over and under blowing of the Bessemer charge. Jones & Laughlin began using this patented process more than a year ago and has also filed patent applications in foreign countries.**

3rd Expansion in Year For Reliance Electric

Cleveland

• • • **Reliance Electric** & Engineering Co. has awarded a contract to the J. L. Hunting Co. for construction of a single-story extension to its present office and factory building at 1088 Ivanhoe Road. Approximately 12,000 square feet of additional floor area will be provided. Transfer of a portion of the company's warehouse and service activities to the new structure will make available an equivalent amount of space in the present plant area for expansion of manufacturing facilities. This latest addition to the Reliance plant is the third in a year. With all improvements, it will cost $60,000.

Domestic Manganese Production Up in July

Washington

• • • **The Bureau of** Mines reports that domestic production of manganese ore containing 35 per cent or more manganese during July totaled 2700 gross tons, shipments amounted to 2900 tons, and producers' stocks at the end of the month aggregated 2300 tons.

In June, according to the bureau, production was 2600 tons, shipments 2300 tons, and producers' stocks as the month ended, 2500 tons. Rate of shipments averaged 2442 tons monthly in 1939, when the total amounted to 29,307 tons.

$700,000 Contract for Boulder Dam Generator

Washington

The Bureau of Reclamation has awarded a $700,000 contract to the General Electric Co., Schenectady, for one 82,500 kva. generator for installation in the Arizona wing of Boulder Dam power plant.

Ferro Enamel Corp. to Double Color Plant Space

Cleveland

• • • **A new addition** to its color factory, which will double present floor space and more than double output, is announced by the Ferro Enamel Corp. here.

SPRINGS
COIL SPRINGS
FLAT SPRINGS
SMALL STAMPINGS
WIRE FORMS
SNAP RINGS
LOCK SPRINGS
SPECIAL SPRINGS
from EVERY TYPE of Wire up to and including ½" diameter
When you need help in the designing of springs that will give you maximum efficiency at minimum cost, remember our engineers are always ready and willing to co-operate with you.
Years of practical experience, plus equipment that is suited to our needs places us in a position to efficiently fill all orders for wire forms, snap rings, small stampings and flat, coil or special springs.
SEND FOR QUOTATIONS
AMERICAN SPRING & MFG. CORP.
General Offices at HOLLY, MICHIGAN
Manufacturing Plants at Holly, Michigan and Belding, Michigan

Quality Products

REQUIRE THIS TIGHTER...STRONGER FASTENING!

TYPE 1 FOR ALL METAL APPLICATIONS

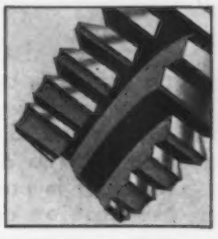
In contributing to the life and performance of metal products, the screws that join vital parts play an important role out of all proportion to their small original cost.

Quality conscious manufacturers using Shakeproof Thread-Cutting Screws are giving their products the essential advantage of tighter, stronger fastenings not obtainable with conventional screws. They know that Shakeproof fastenings protect vital connections for the life of the product—enabling it to keep on delivering its top performance.

Your product deserves the extra benefits of Shakeproof Thread-Cutting Screws. A trial will convince you—write for free testing samples today!

Also available with Phillips Recessed Heads

Type 2 for Plastics!
Made with a double thread-cutting slot, this screw drives easily in all types of plastics, eliminating the need for threaded inserts or separate tapping operations.



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Distributor of Shakeproof Products Manufactured by ILLINOIS TOOL WORKS
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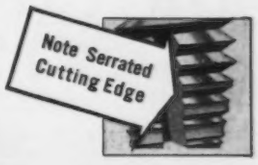
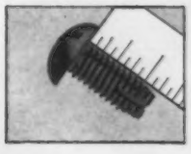
ONLY SHAKEPROOF THREAD-CUTTING SCREWS HAVE ALL THESE IMPORTANT FEATURES!

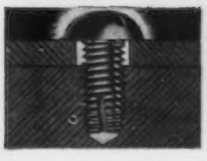
Cuts Its Own Thread





Standard Machine Screw Thread Assures Perfect Engagement.

A Stronger fastening . . . because of tighter fit.



Replaceable with Machine Screw of Same Size.

SHAKEPROOF

"Fastening Headquarters"

SEMS Fastener Units . . . Lock Washers . . . Locking and Plain Terminals

Thread-Cutting Screws . . . Locking Screws . . . Spring Washers . . . Special Stampings

Submarines to be Built In Manitowoc, Wis.

Manitowoc, Wis.

• • • **City officials** here have learned that the Manitowoc Shipbuilding Co., whose $3,500,000 drydocks and shops have been operating here since 1905, will build submarines for the Navy for the first time. This is in line with the government's new policy of locating such operations in the interior of the country for maximum protection.

Hudson Plant Payroll Lifted to 12,500 Men

Detroit

• • • Employment at the Hudson Motor Car Co. plants here was boosted last week to 12,500 men, and peak production was scheduled to be reached during the current week. During this week virtually the entire industry will be on a five-day week production basis.

Kelvinator Sets Up U-Type Enameling Furnace

Cleveland

• • • **The Kelvinator** division of Nash-Kelvinator Corp., Grand Rapids, Mich., is installing a large "U"-type continuous porcelain enameling furnace, which will be fired with natural gas and equipped with a full Norton Alundum Super-Refractory Muffle.

Car Loadings 7.3% Above Like '39 Week

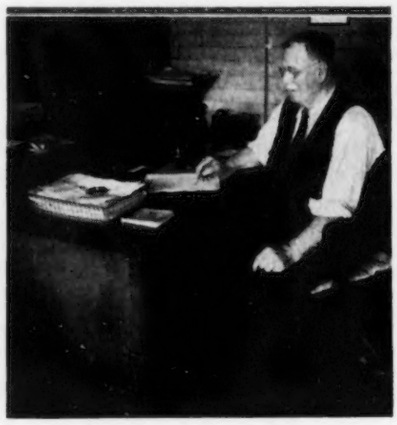
• • • **Loading of revenue freight** for the week ended Aug. 31 totaled 768,821 cars, the Association of American Railroads announced. This was an increase of 52,424 cars or 7.3 per cent above the corresponding week in 1939 and an increase of 120,792 cars or 18.6 per cent above the same week in 1938. Loading of revenue freight for the week of Aug. 31 was an increase of 7819 cars or 1.0 per cent above the preceding week.

Industrial Milestones

Eighty-six years ago (1854) Duncan Forbes established the Gunnite Foundries Corp. at Rockford, Ill., later to be the first manufacturer of malleable iron in the Middle West. Recently a representative of the fifth generation of the Forbes family, Duncan P. Forbes, Jr., began his career with the Gunnite company as a foundry laborer. When the company announced that a new Forbes would join its payroll, it likewise announced a new product—electric steel castings.

* * *

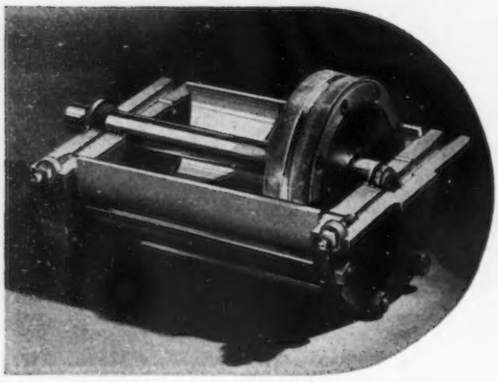
One hundred and sixty-six years ago (1774), a man named Jonathan Wilson got a job with Jessop of Sheffield (Eng.) as a wheelwright. This year Harry Wilson, Sr., a descendant of Jonathan Wilson, is celebrating his 65th year of service with Jessop of Sheffield and with Jessop Steel Co., of Washington, Pa. For 166 yrs. members of the Wilson family have worked for the Jessops.



Harry Wilson of Jessops

Harry Wilson began working for the parent Jessop company at Sheffield in 1875 when he was 11. His first job was screw boy and at 19 he was a sheet mill roller. In 1905 he was sent to the U. S. where he became night superintendent of the sheet mills in the new plant which the Jessops had established in Washington, Pa.

adjustable "cushioned" air cylinder strokes



T-J CUSHIONED AIR CYLINDER

Complete specifications of Cushioned and Non-Cushioned types are shown in our Catalog 36-A. Your copy will be sent promptly. Address The Tomkins-Johnson Co., 628 N. Mechanic Street, Jackson, Mich.

The action of the cushioned part of an air cylinder stroke depends on variables that are, at best, difficult to determine. This condition can be offset in part by having this cushion action adjustable. Cushion adjusting screws operate to "slow" or increase the speed of the cushion action.

Furnished as standard equipment on T-J Cushioned Air Cylinders, these screws may be readily ***adjusted and locked in position on the job.***

this is a **TOMKINS-JOHNSON** *product*

SPARE YOUR SKILLED FORGING CRAFTSMEN—

AJAX *Forging Machines substantially increase production of upset forgings and decrease fatigue to operators*

UPSET FORGING
Offers Substantial Savings in Steel, Machining, Freight

ON FORGINGS weighing from a few ounces to many pounds, Ajax Air Clutch Forging Machines have substantially increased production. Smooth cushioned starting at high speed makes possible increased production on all types of upset forgings and completion of many multi-operation forgings at a single heat, which would otherwise require reheating.

The quick response of Ajax Air Clutch Forging Machines increases output to the maximum limit of the operator's ability to feed stock. Increased production is due to three things: (1) effortless tripping, through a foot valve with small movement, enables the operator to support his weight all the time on two feet, in a well balanced position, as it is unnecessary to kick or throw his weight on a pedal; (2) instant response of air clutch relieves operator from supporting bar in tense position after tripping, waiting for the machine to respond; (3) correct operating height and convenient throat design, obtained without sacrificing bed rigidity at the support of the stationary die, facilitate feeding since the distance the bar must be handled forward into the machine is minimized, and the operator can stand close to the dies where the bar can be supported with least exertion.

Abundant power of Ajax Air Clutch Forging Machines and the unyielding rigidity of the one-piece solid steel frame withstands tremendous pressures of gripping and heading, resulting in unusually accurate die and tool alignment and consistently uniform, accurately matched forgings.

Spare your skilled craftsmen. Get increased production of forgings for industrial use, as well as for aircraft, ordnance, navy and diesel construction, with Ajax Air Clutch Forging Machines. Write for Bulletin 65-A describing sizes 2" to 8".

THE AJAX MANUFACTURING COMPANY

621 MARQUETTE BLDG. CHICAGO, ILLINOIS

EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING NEW LONDON, CONN.

Census Return to Give Defense Information

Washington

• • • **The first returns** from the 1939 census of manufacturing under a re-arranged tabulation schedule approved by the Bureau of the Census will show the National Defense Advisory Commission comparisons between 1939 and 1937 on the number of plants, wage earners and production in machine tools, blast furnaces, steel works, shipbuilding, aircraft, tractors, automobiles, and other industries. Selecting 75 industries, the census bureau, at the request of the defense commission, plans to give the right-of-way to reports covering industries deemed of special importance to defense.

FASTER!
You Can Step Up
Production With These
SPIRAL WOUND
BRUSHES
● "Pittsburgh" Spiral Wound Brushes help speed the production of light gauge steel and tin-plate. And they do more! They cut finishing costs as well.
Investigate! "Pittsburgh" Spiral Wound Brushes, of wire, horsehair and tampico, can be made to order to meet your individual production requirements.
Consult with our technical experts. Write or telephone—today.
PITTSBURGH
PLATE GLASS COMPANY
Brush Division : Baltimore, Md.

N.I.A.A. Appoints Moule Conference Vice Chairman

Promotion to the vice-chairmanship of the 18th annual conference of the National Industrial Advertisers Association (Detroit, Sept. 18-20) has been accorded to Tom Moule of Seiler, Wolfe & Associates, it has been announced by Lloyd R. Vivian, Ditzler Color Co., Detroit, who is chairman of the conference. Mr. Moule, president-elect of the Industrial Marketers of Detroit, NIAA Chapter has been serving on the attendance promotion committee of the conference. Formerly he was advertising manager of Ex-Cell-O Corp., Detroit.

Ohio Foundrymen to See Bethlehem Film

Cleveland

• • • **The first meeting** of the new year for the Northeastern Ohio Chapter of the American Foundrymen's Association will be held Thursday, Sept. 12, in the Cleveland Club, featuring a showing of a new Bethlehem Steel Corp. motion picture entitled "Sinews of Steel." The evening will be known as "new officers and directors night."

Welsh Tin Plate Output Declines

• • • A considerable decline in Welsh tin plate output is foreshadowed by the latest returns covering fresh contracts obtained by manufacturers. Orders booked by Welsh tin plate manufacturers during the week ended Aug. 3 totaled 216,873 basis boxes, as compared with 257,016 the previous week. Of the former total 87,287 were for export, compared with 147,811.

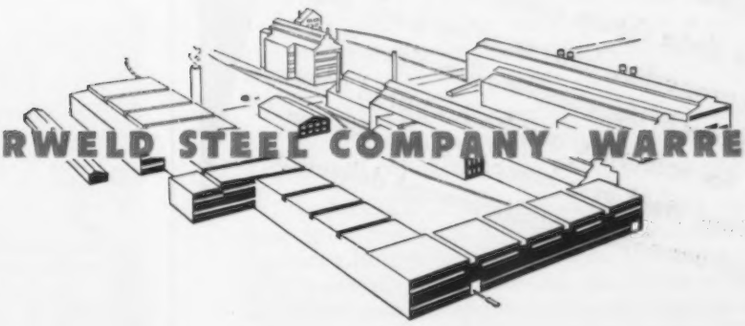
Unfilled orders on Aug. 3 aggregated 5,947,961 basis boxes, compared with 6,086,239. Cancellations during the same period were returned at 48,781 basis boxes.

It will be recalled that, for the purpose of concentrating Britain's resources on defense needs, the government recently decided to eliminate all non-essential tin plate manufactures, involving approximately 1,000,000 boxes a year.

ARISTOLOY STEELS

ARISTOLOY STEELS *are made in a plant designed solely for the production of alloy steels*

Copperweld's alloy steel plant at Warren, Ohio, didn't just grow; it was designed and built to meet the ideas of experienced men who have been making alloy steels for twenty-five years and more. This modern alloy steel plant is a completely self-contained unit — a business of its own — not just a department of a larger organization.



COPPERWELD STEEL COMPANY WARREN, OHIO

ARISTOLOY S.A.E. ALLOY BILLETS AND BARS; OXIDATION AND CORROSION RESISTING STEELS; TOOL AND SPECIAL STEELS; AIRCRAFT QUALITY STEELS; STAINLESS STEELS

Knudsen Finds Tax Provision "Radical"

Washington

Members of the National Defense Advisory Commission, led by William S. Knudsen, asked the Senate Finance Committee last week to strike from the excess profits tax bill a House provision under which the government would have some control over future disposition of new industrial facilities after the passing of the emergency. Members emphasized while testifying before the committee that private industry would do more than its share in producing defense material provided it could have assurances against any form of government domination and that the country would snap back to pre-war conditions.

Referring to the House provision as "a radical new departure," Mr. Knudsen said:

"As I understand the effect of the added provisions, any business which expended its private funds for the erection or construction of required new facilities would, in order to secure the deductions recommended by the sub-committee, be compelled to give a consent that it would not destroy, demolish, impair or substantially alter such emergency facilities without the consent in writing of the Secretary of War or the Secretary of the Navy.

Further, by refusing consent, the government would be in a position to acquire the property at not the then fair value of the private business, but at the so-called 'adjusted' basis, which is the original cost, less tax deductions, and which in many cases would be some nominal sum not less than a dollar."

It was Mr. Knudsen's observation that under such a provision where owners of emergency facilities agreed on the proper tax treatment, the disposition of the property, though constructed with private funds, would be placed directly under the control of the government. He likewise emphasized that the provision would discourage the investment by private capital in defense facilities with resultant unnecessary burden on government funds; and that it would tend to put a stop to beneficial results expected from the amortization provision of the pending tax bill.

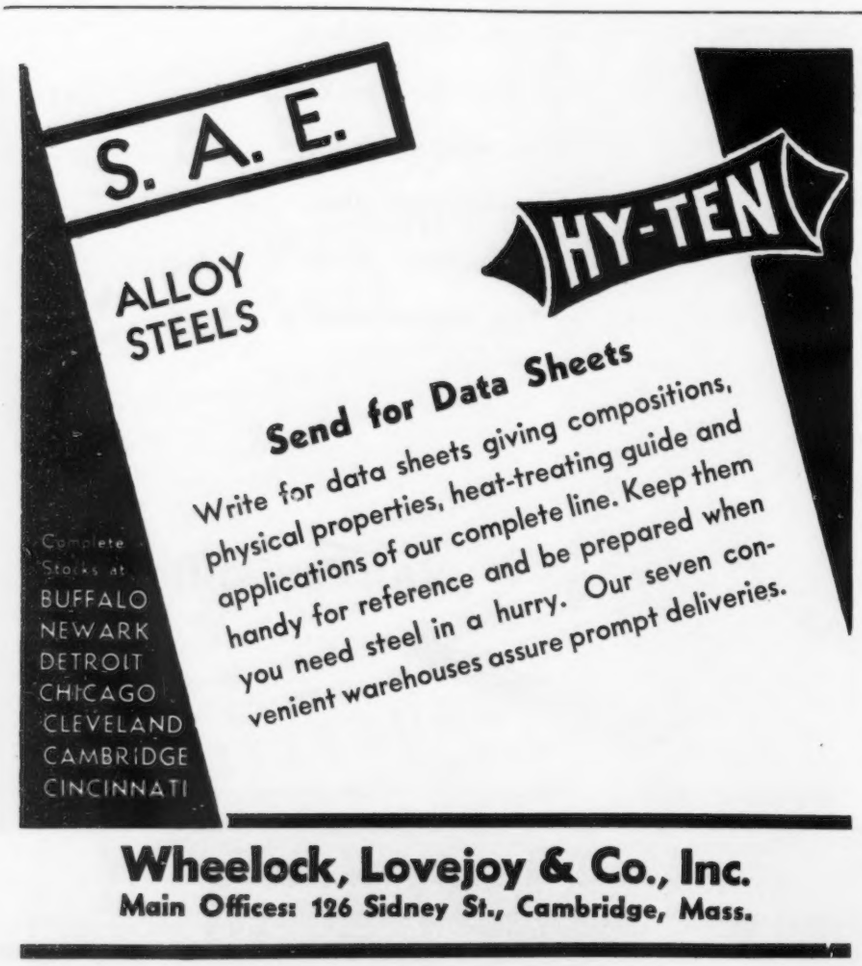
He joined other representatives of the commission in recommending that the disposition of new plants built by private capital as an essential part of the defense program be made the subject of contract negotiations between the government and industry.

Mr. Knudsen, who told the committee that during a recent inspection trip of industrial defense facilities he found private manufacturers were showing the greatest concern over the amortization provisions of the tax bill, testified that if Congress passes "a legitimate five-year amortization plan" the commission will have no trouble in placing contracts for all the government's defense necessities.

"I consider the defense program good insurance for our country in these uncertain times," the former General Motors executive said in expressing his personal opinion on the excess profits tax proposal. "I believe that a substantial part of the cost should be assessed against us now by equitable taxation of individuals and corporations."

John D. Biggers, chairman of

(*Continued on page 89*)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Write for data sheets giving compositions, physical properties, heat-treating guide and applications of our complete line. Keep them handy for reference and be prepared when you need steel in a hurry. Our seven convenient warehouses assure prompt deliveries.
Complete Stocks at
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Main Offices: 126 Sidney St., Cambridge, Mass.

Armor Plate Plant For Mingo Junction

Pittsburgh

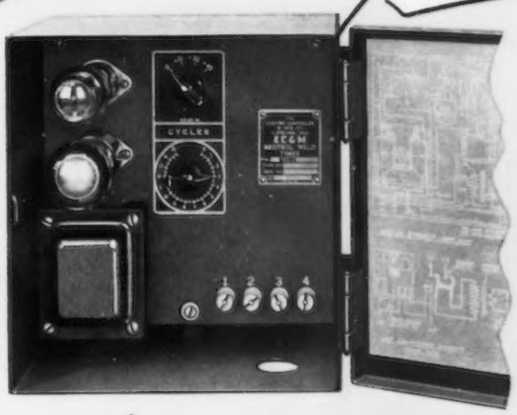
• • • To further supplement its heat treating facilities at the Homestead works, Carnegie-Illinois Steel Corp. is installing new equipment at the Mingo Junction works for heat treatment of armor plate.

Early in 1939 the corporation started to use the heat treating furnaces at the U. S. Naval Ordnance plant at South Charleston, W. Va., for light armor plates and later began producing heavy plate through the use of a forging press at this plant which is currently undergoing rehabilitation.

You can be sure of GOOD WELDS with these accurate EC&M TIMERS

The EC&M NEOTROL WELD TIMER

$50.00



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LOW COST
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ETC.

The EC&M NEOTROL COMPENSATING WELD TIMER

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Provides COMPENSATED TIME
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LONGER or SHORTER
TIME *Automatically*

TYPE 2-A NON-BEAT
EC&M NEOTROL WELD TIMER

The Type 2-A Timer, available in NEOTROL and NEOTROL-*Compensating* styles, is for use on air or hydraulically-operated welding machines and is equipped with a non-beat feature to prevent the electrodes from being opened before the weld is completed. Type 2-A provides Weld-Time only. Type 2-B provides Weld-Time and Hold-Time and Type 2-C provides Squeeze-Time, Weld-Time and Hold-Time. Different forms of these Timers provide different values of times for various applications.

OPERATING on the electronic principle (a proven, but heretofore expensive method for obtaining accurate results), these EC&M Weld Timers make it possible to secure precision timing on any welder. Their low cost justifies their use on the machine of small capacity as well as on the large welder. And operation is not dependent upon mechanical adjustments or any elements affected by temperature or atmospheric changes.

The NEOTROL Timer, of the definite-time type, measures the "time" or "duration" of the weld. When adjusted for a fixed value of time, this Timer will reproduce this time consistently.

The NEOTROL-*Compensating* Timer, operating on the time-current principle, measures the heat-units put into each weld. It automatically provides longer or shorter time to compensate for variable conditions, such as—voltage fluctuations, condition of electrode points, condition of surface of work being welded and variation in the thickness of the pieces or in the number of pieces being welded. Where accurate control of the heat-units put into each weld is imperative, this Timer is especially recommended. Its use is equally important for applications requiring long-time.

EC&M Weld Timers are accurate and easy to adjust. Calibrated dials make setting as easy as tuning a radio. In hundreds of installations, they are providing GOOD WELDS—on stainless steel—galvanized metal—non-ferrous metals—as well as on sheet metal, etc. Ask for complete information about them.

(*see other side*)

FOR BEST RESULTS, USE WITH EC&M BULLETIN 1211 MAGNETIC CONTACTORS

The INTERRUPTED Type

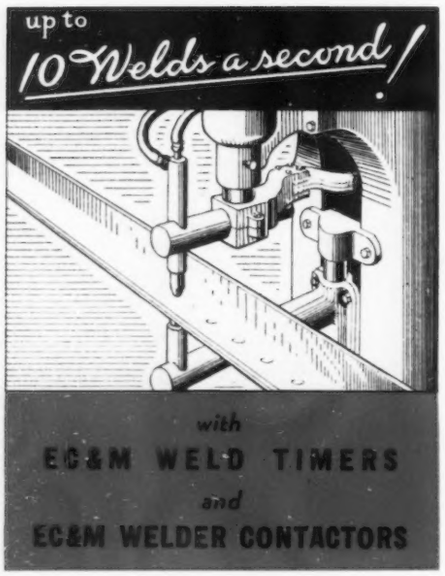
Provides INTERRUPTED WELDING

Saves Electrode burning and reduces heating
Permits Welding Thick pieces by gradually bringing them up to Fusion Temperature

In the Interrupted Type Timer, the electrodes remain clamped on the work but the welding current is turned on and off automatically for a given number of operations. The operation is similar to the repeated and intermittent thrusts of a woodpecker's bill in drilling a hole in a tree. This intermittent method of current application gives a more gradual rise in temperature in the pieces to be welded and is especially desirable for welding thick pieces.

Burning and heating of the electrodes is reduced; the water cooling is given the opportunity to carry away the heat generated at the electrode points.

Interrupted Type Timers are provided with all or any combination of these six timing periods—Squeeze-Weld-Heat-Cool-Hold-Off. Each period is independently adjustable by a convenient rheostat or dial switch.



ask for
Bulletin 1201 for WELD TIMERS
Bulletin 1211 for WELDER CONTACTORS

TYPE 3-B AUTOMATIC-REPEAT...

The Automatic-Repeat Timers are for use with air or hydraulically-operated welders and their function is to automatically repeat a given welding cycle as long as the welding-operator holds a push-button in the closed position. During the off-time, which is independently adjustable, the operator is provided with a suitable time to move the work along to the point where the next weld is to be made. These Timers make it possible to produce quickly a series of spot welds between two overlapped pieces of metal in much the same manner that a sewing machine stitches two pieces of cloth together.

The Type 3-A Timer provides Weld-Hold-Off times, in which the squeeze-time or clamping of the electrodes on the work is accomplished independently of the timer. The 3-B Type permits Squeeze-Weld-Hold-Off times in which an adjustable period of time is allowed after movement to clamp the electrodes is started before the welding current flows. Each period of timing with these Timers is independently adjustable by means of a small rheostat or dial switch.

THE ELECTRIC CONTROLLER & MFG. CO. CLEVELAND, OHIO

THE ELECTRIC CONTROLLER & MFG. CO.
2706 E. 79th Street **Cleveland, Ohio**

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

FEWER WELDS FOR DESIRED STRENGTH THROUGH THESE

Accurate EC&M WELD TIMERS

(*Continued from page 86*)

the commission's committee on taxation and finance, declared that the sole purpose of the amortization provision is to encourage private capital to build new plants and facilities. He told the committee that he couud see no justifiable reason for the Treasury Department, as proposed in the House Bill, keeping its hands on facilities put up by private capital.

Mr. Biggers reiterated the three plans under which the commission expects to organize the financing of new plants for national defense:

1. The financing by private capital under the inducements of rapid amortization. (He called this the most important of the three plans.)

2. Initial financing of new plants by private industry but direct reimbursement by the government.

3. Outright construction by the government of facilities to manufacture supplies not produced or used on a large scale in peace time such as powder, tanks, guns and similar products.

Leon Henderson, head of the commission's price stabilization division, disclosed that the government is already getting price advantages in large-scale orders and that there is "much sharper negotiating on the government's side than there was in the World War."

Half Billion Spent On Canada's Plants

Toronto

• • • **Upward of $550,000,000** has been expended in Canada since the war began to build up the Canadian war machine and assist the efforts of Great Britain. This is approximately half the sum that has been provided as war expenditure to the end of March, 1941, indicating that there will be no letup of activities in this country.

The continued demand for war materials is particularly affecting the Canadian steel industry, which today is producing at the highest rate in history and with backlogs sufficient to keep this pace for many months into the future.

Canadian Pacific Railway Co. has placed contracts for rolling stock to cost approximately $2,500,000. Orders were placed with Canadian Car & Foundry Co., Ltd., Montreal, for 100 75-ton steel gondola cars, 10 baggage and express cars and 25 frames for passenger coaches. The National Steel Car Corp., Ltd., Hamilton, Ont., received an order for 100 gondolas and 300 50-ton hopper cars. Interior work and finishing of the coaches will be done at the C. P. R. Angus shops at Montreal. The Angus shop recently closed a contract with the government for the construction of 300 18-ton tanks for the British and Canadian governments, according to E. W. Beatty, president of the Canadian Pacific Railway, and construction work now is proceeding.

Under Canada's industrial expansion on war account, C. D. Howe, Minister of the Department of Munitions and Supply, Ottawa, stated that another three plants costing in all $17,500,000 will be started immediately. These comprise an $8,000,000 chemical plant in Western Canada, a $7,000,000 gun plant and a $2,500,000 rifle plant, the latter two to be erected in Central Canada. The plants will be wholly owned by the Canadian government. The chemical plant, which will involve the purchase of a number of special tank cars for transporting chemicals, will be constructed and operated under the supervision of Allied War Supplies Corp., a wholly-owned government company created to administer the various components in the Canadian explosives program. The gun plant will produce rapid action anti-aircraft artillery and will have annual output of between $40,000,000 and $60,000,000. The rifle plant will be built and operated by Small Arms, Ltd., a recently created and wholly-owned government company of which directors are as follows: G. S. Brade, vice-president of Canada Cycle & Motor Co., Toronto, president; N. P. Petersen, James I. Simpson, Paul Bourget, directors.

In his report for the period ended Aug. 31, Mr. Howe stated that during the past week work was begun on several additional major plants in the government's industrial development program, which now involves expenditures

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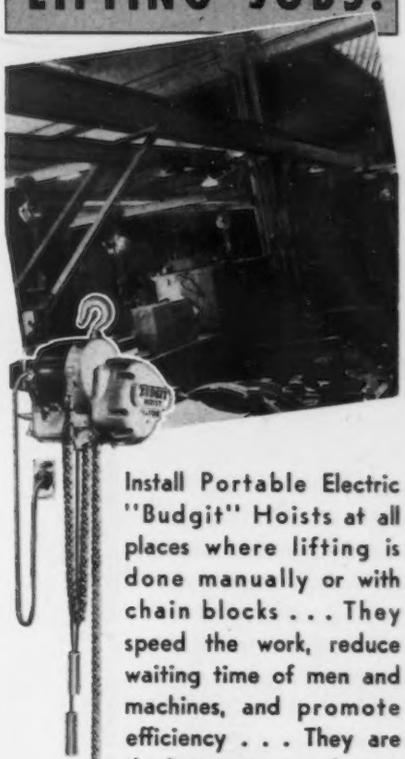

Install Portable Electric "Budgit" Hoists at all places where lifting is done manually or with chain blocks . . . They speed the work, reduce waiting time of men and machines, and promote efficiency . . . They are the first step towards mass production methods!

"Budgit" Hoists come in sizes to lift loads up to 250, 500, 1000, and 2000 pounds with speeds to suit today's tempo . . . You can afford "Budgits"! Prices start at $119. and there's nothing else to buy . . . You simply Hang up, Plug into the nearest electric socket and use!

Send for catalog containing complete information, also "Time Savings Calculator" that shows savings they earn.

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MANNING, MAXWELL & MOORE, INC.
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Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send all your crane and hoist inquiries to "Shaw-Box"!

Portable Electric BUDGIT HOISTS

and commitments totaling more than $165,000,000. The development program involves more than 100 plants in Canada. Some of these plants already are in operation, a large portion are scheduled to reach production within the next six months, still others in the second quarter of next year and a few to be completed in the latter half of 1941. He stated that purchases by the Department of Munitions and Supply to the above date exceed $30,000,000. Purchases made on British account total some $85,000,000.

Thus with the $165,000,000 for plant construction, expenditures and commitments in the past eleven months amount to $550,000,000. Mr. Howe stated that the chemical and explosives program involves creation of nine plants at cost of over $50,000,000. Upward of $50,000,000 is being expended on plants for manufacture of armaments, including shells, small arms munitions, tanks, special types of machine guns, anti-aircraft artillery, and all components. In addition, very large expenditure has been authorized for production of substantial tonnages of variety of non-ferrous metals, including brass. The way in which new plants have been and are being financed takes a variety of forms. In some instances entirely new plants are being built; in others existing plant facilities have been extended and in still others equipment has been purchased.

Since the first of September contracts totaling upward of $25,000,000 have been placed by the Department of Munitions and Supply, of which approximately $5,000,000 was for construction projects other than industrial plants. Awards by the department just reported show contracts to United States firms totaling $2,739,516, and included Packard Motor Car Co., Detroit, $2,582,085, and Bausch & Lomb Optical Co., Rochester, N. Y., $157,429. Awards to Canadian companies include:

Mechanical Transport — Ford Motor Co. of Canada, Ltd., Windsor, $111,541; Kelsey Wheel Co., Ltd., Windsor, $25,210.

Aircraft Supplies — Canadian Pratt and Whitney Aircraft Co., Ltd., Longueuil, Que., $170,000; British Aeroplane Engines, Ltd., Montreal, $252,235.

Electrical Equipment—Canadian Marconi Co., Montreal, $258,606.

Munitions — Dominion Arsenal, Quebec, Que., $569,807; Defense Industries, Ltd., Montreal, $470,386. C. P. Fabian, Ltd., Montreal, $31,564.

Dominion Appoints Arms Output Chiefs

• • • C. D. Howe, Minister of the Department of Munitions and Supply, Ottawa, has appointed Frank M. Ross as director general of production of naval armament and equipment of the Department of Munitions and Supply, and E. J. Brunning as associate director general of munitions.

p&h ELECTRIC CRANES

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• Whatever your particular task in the handling of heavy materials may be, you can be sure they will be thoroughly understood by P&H crane engineers. As America's leading builders of overhead handling equipment, more than 50 years' experience in building more than 10,000 electric cranes is at your command. To meet your requirements in the most prompt, efficient manner, call in a P&H engineer.

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ELECTRIC CRANES • EXCAVATORS • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

Jones & Laughlin Buys McKeesport Tin Plate Mills

Pittsburgh

McKeesport Tin Plate Corp. has announced the sale of the fixed assets and good will of its tin plate division at McKeesport, Pa., to Jones & Laughlin Steel Corp. In leaving the tin plate business, the company stated that it will concentrate on the operations and expansion of the National Can division which has plants at Maspeth, N. Y., Baltimore, Boston, and Hamilton, Ohio. Operations in the lithographing division at McKeesport will be continued.

The tin plate plant at Port Vue, McKeesport, was built in 1902-03. Making the company one of the oldest independents in the country. Present capacity is rated at 174,000 tons of hot rolled tin plate and 6000 tons of terne plate.

By making this acquisition, Jones & Laughlin will almost double its own capacity. Beside confirming the announcement, however, J. & L. has declined further comment until plans are fully developed. At present it is not known whether J. & L. will operate the hot mills or just the tinning equipment.

Output of the McKeesport plant was sold chiefly to American Can and its own subsidiary, National Can, and the trade here presumes J. & L. will handle much of this business.

McKeesport will continue to operate its own mills until present commitments are fulfilled.

Continental Can Plans $15,000,000 Expansion

Chicago

• • • **The Board of directors** of Continental Can Co. at a meeting here approved a $15,000,000 expansion program. Completion is expected within two years.

• • • **Koebel Diamond Tool Co.**, Detroit, is moving in early September to a new factory facing the Detroit City Airport.

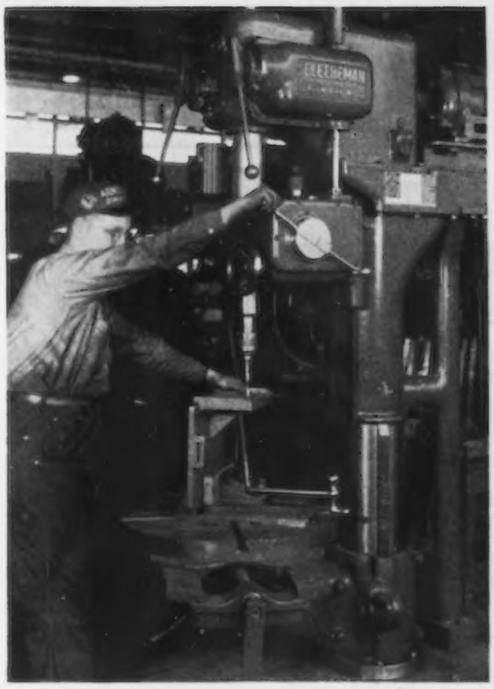
Defense Board Seeks Scrap License Extension

Washington

• • • **Extension of the** iron and steel scrap licensing system has been recommended by the National Defense Advisory Commission and approved by Lieut.-Col. R. L. Maxwell, administrator of export control. The report on the proposed extension has been sent to the White House for final action.

At present the licensing system applies only to No. 1 heavy melting steel. It has not been indicated whether the proposed extension would blanket all or only a few additional grades of scrap.

Armstrong-Blum Uses Cleereman Drilling Machines



HERE is a CLEEREMAN 30-Inch Machine drilling, reaming and tapping holes in a part for a MARVEL High Speed Sawing Machine in the plant of Armstrong-Blum Mfg. Co., Chicago.

You, too, can take advantage of the shop economies offered by CLEEREMAN Drilling Machines.

•

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Address
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CLEEREMAN
DRILLING MACHINES and JIG BORERS

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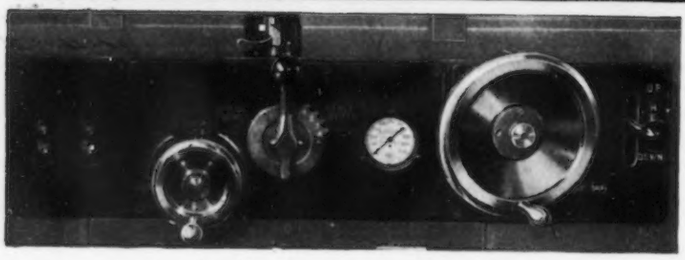

Model 'F' SURFACE GRINDERS

have a convenient, simplified control panel that puts an element of pleasure in the task of speeding production.

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ANY METAL • ANY PERFORATION

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5657 FILLMORE STREET—CHICAGO, ILL. New York Office, 114 Liberty Street

. . Trade Notes . .

Contract has been let to the H. K. Ferguson Co., Cleveland, by the Corning Glass Works, to design and construct a warehouse at the Wellsboro, Pa., plant. The building is to be one story, 60 ft. x 260 ft., corrugated steel, steel sash, and concrete floors. The warehouse will be used for the storage of glass Christmas tree ornaments. This item has recently been added to the Corning Glass line to replace the foreign supply, now largely cut off by war conditions.

•

An Indiana charter has been granted to the L&J Press Corp., which is taking over the Loshbough-Jordan Tool & Machine Co., at Elkhart, Ind. The sale includes real estate, buildings, machinery, etc. The business consists of the manufacture and sale of the well known L&J Punch Presses. Heading the new corporation are J. M. Hartgering and D. R. Grossman, of Detroit.

•

Otto Construction Co. has established offices at 500 Fifth Avenue, New York, for the building of the Otto coke oven and Otto equipment for by-product recovery and treatment. The Otto oven is of the "hairpin-flue" type, equipped with underjet for rich and lean gas and air and with high and low burners. Dr. Carl Otto is president, Frans Wethly, vice-president, and Fred Stadelman, assistant to the president.

•

W. Greene Electric Co., Inc., 192 Broadway, New York, announces the addition to their staff of L. W. Reinken, electrical engineer, formerly of the International Telephone Development Co., who recently returned to the United States after eight years abroad, where he had been engaged in supervising the promotion of selenium rectifiers.

•

Board of Directors, New River State College, Montgomery, W. Va., plans new one and multi-story arts and crafts building for expansion in vocational division. Cost about $200,000 with equipment. Appropriation in that amount has been secured. Alexander Mahood, Bluefield, W. Va., is architect.

•

H & H Research Co., Detroit, manufacturer of Multi-Purpose (reciprocating head) electrical tools, has appointed Detroit International Trading Corp., 544 Insurance Exchange Building, as its exclusive export agent, effective, Aug. 15.

•

Reliance Electric & Engineering Co. is opening a sales office in Houston, Texas, with Frank A. Denison, Jr., as district manager, it is announced by James W. Corey, vice-president in charge of sales.

•

Harnischfeger Corp., Milwaukee, has appointed as agents for its line of welders and electrodes the Faeth Co., 1127-1131 W. 8th St., Kansas City. The Faeth Co. will operate in the Kansas City territory under the supervision of C. Powell.

•

American Steel & Wire Co. has let a $20,000 contract to the Alger-Rau Co. for foundation work for an extension of its cold-rolled annealing plant of the Cuyahoga Works here. The building will be one story, with four bays.

•

Granite City Steel Co., Granite City, Ill., announces the removal of their Western district office to 1016 Baltimore Avenue, Kansas City, Mo., on Sept. 1.

•

Chain Belt Co., Milwaukee, announces the removal of its Minneapolis office from 808 LaSalle Avenue to 1645 Hennepin Avenue.

John A. Penton Dies Suddenly

• • • **John A. Penton,** chairman of the board, Penton Publishing Co., Cleveland, publisher of *Daily Metal Trade, Steel, The Foundry* and other business publications, died suddenly at his home in Santa Barbara, Cal., Sept. 8, age 78 years.

Beginning as a molder in a foundry, Mr. Penton's first activity in the publishing field was as editor of the *Machinery Moulders Journal* in Detroit. In 1892 he established his own publication, *The Foundry.* He removed the publication office from Detroit to Cleveland in 1901, affiliating with the Iron Trade Review Publishing Co., publisher of *Iron Trade Review.* In 1904 he acquired control of the publishing company and changed the name to the Penton Publishing Co., of which he served as president until 1924 when he became chairman of the board.

Mr. Penton was active in the formation of the American Malleable Casting Association and acted as its first secretary from 1890 to 1901 and president in 1921-22. He organized the American Pig Iron Association, serving as its secretary and manager from 1904 to 1928, when the organization was disbanded. In 1918 he became a director of the Wellman-Seaver-Morgan Co., Cleveland, now Wellman Engineering Co., and was elected chairman of the board in 1927. He was active in civic affairs in Cleveland and a patron of music and the arts.

Unemployed Counted For Defense Program

Washington

• • • **In announcing** a three-phase labor supply program which he says will assure adequate man power for the defense program, Sidney Hillman, in charge of the Labor Division of the National Defense Advisory Commission, pointed out the first step, already completed, was to inventory the number of unemployed according to skills.

Through the 1500 offices affiliated with the United States Employment Service, it was stated, 5,500,000 men have been registered. Available at all times to private employers, Mr. Hillman said, is a list of men in particular trades or skills in each locality.

FOR HANDLING SHEET STEEL IN CLOSE QUARTERS

Where headroom is low and where storage area is confined, C-F Sheet Lifters handle tons of stock easily and safely. C-F Lifters need only 5" or 6" between piles, may be lowered vertically over a pack or bundle of sheets and are adjustable for stock from 12" to 72" wide.

C-F Lifters feature safe, one-man end control, in standard manual or powered units of 2 to 20 ton capacity. C-F Lifters accommodate sheets up to 72" wide or may be had in any special size to meet requirements.

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C-F Lifters have tong action; carrying angles are always outside jaw hinge points . . loads cannot slip.

Jaw controlling mechanism is positive in any position.

Write today for circular giving full information about C-F Lifters.

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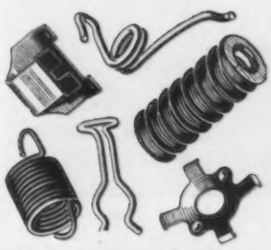
CULLEN-FRIESTEDT CO.

1303 S. Kilbourn Ave. Chicago, U. S. A.

TWIN PLANTS

Insure

SPRING DELIVERIES



Meeting the exacting demands of leading mass-production industries—successfully—is a matter of record here. Either or both B-G-R plants are ready to plunge into your spring requirements—with engineering and design assistance—or just fast production and delivery.

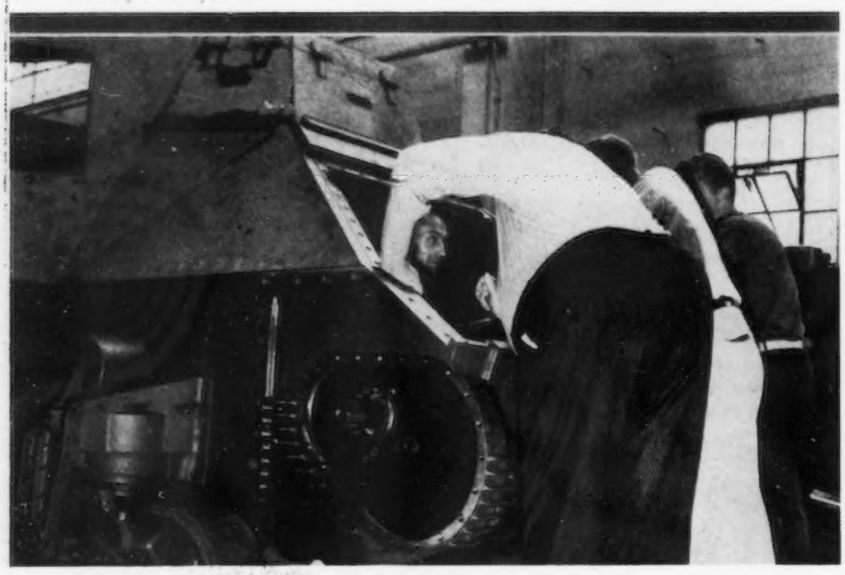
Each B-G-R plant is similarly equipped with modern machines, heat treating equipment, laboratories—and what's equally important—a goodly supply of spring materials in many sizes and kinds.

It's good insurance for your assembly lines to use B-G-R service in the form of springs, stampings, wire forms

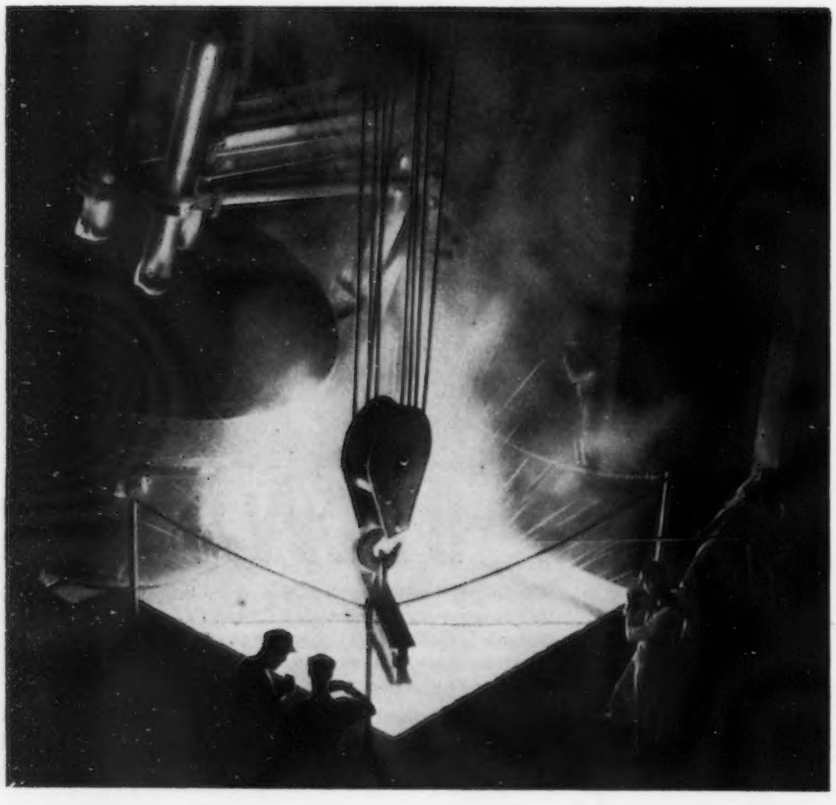
BARNES-GIBSON-RAYMOND

DETROIT PLANT — DIVISION OF ASSOCIATED SPRING CORP. — ANN ARBOR PLANT

DETROIT, MICHIGAN ← TWO PLANTS → ANN ARBOR, MICHIGAN



SHOWN HERE is a medium tank (18 tons) now being turned out for U. S. defense at the Rock Island Arsenal, Rock Island, Ill. Lack of tanks for the U. S. Army is considered by some observers to be as great a hole in the nation's defense as the shortage of airplanes.



ELECTRIC FURNACE STEEL, recently referred to as the "keystone of the arch" in national defense armament manufacture, is undergoing a large expansion with which Republic, Bethlehem and Crucible are prominently identified.

Contracts Awarded for Folding Steel Cots

Washington

• • • Awards have been made by the War Department for folding steel cots as follows:

Barcalo Mfg. Co., Buffalo, $89,100; Doehler Metal Furniture Co., New York, $95,250; Haggard & Marcusson Co., Chicago, $33,400; Hard Mfg. Co., Buffalo, $248,750; Logan Co., Louisville, $98,400; Normal A. Siegal (individual trading as Moto Scoot Mfg. Co.), Chicago, $95,700; Smith & Davis Mfg. Co., St. Louis, $29,700; Moto Scoot Mfg. Co., Chicago, $94,500; Hard Mfg. Co., Buffalo, $48,850; Barcola Mfg. Co., Buffalo, $147,600; Smith & Davis Mfg. Co., St. Louis, $83,625; Vincent McCall Co., Kenosha, Wis., $83,000; Haggard & Marcusson Co., Chicago, $33,400; Spring Products Corp., L. I., New York, $16,700; Superior Sleeprite Corp., Chicago, $251,250; Shott Mfg. Co., Cincinnati, $68,600.

120 Pursuit Planes Ordered for Army

Washington

• • • **The War Department** on Tuesday announced award of a contract to the Bell Aircraft Corp., Buffalo, for 120 pursuit airplanes with spare parts to cost $4,962,220.

Steel Bomb Shelters Effective in London

London

• • • **Success of the Anderson steel shelter in recent British air raids suggests that a steel shelter of this type, which can be mass-produced easily, may be adopted all over the world as an efficient and inexpensive method of protecting the civilian population during aerial bombing attacks. Many thousands of people found safety in these shelters during the recent raids on London.**

When a bomb dropped in the center of a triangle formed of three of these steel shelters the occupants all escaped unhurt. Seven people taking cover in a home-made shelter, however, were killed. In another case the occupants of a steel shelter were unscathed when a bomb exploded immediately outside it.

Pittsburgh, Chicago to Honor Irving S. Olds

Pittsburgh

• • • **Several hundred** Pittsburgh civic and business leaders have been invited by B. F. Fairless, president, U. S. Steel Corp., to meet officers and directors of the corporation at a luncheon here on Sept. 18, to honor Irving S. Olds, chairman of the board. In addition to Mr. Olds and Mr. Fairless, eleven of the corporation's directors will be present.

This group of executives will make one-day visits to the corporation plants in Pittsburgh, Chicago and Birmingham. While in Pittsburgh on Sept. 18, they will tour Edgar Thomson works and Irvin works of Carnegie-Illinois Steel Corp. A luncheon at which Chicago business leaders will meet Mr. Olds and other corporation officials will be held Sept. 19 at the Blackstone Hotel, Chicago.

U. S. Steel Shipments Highest Since 1937

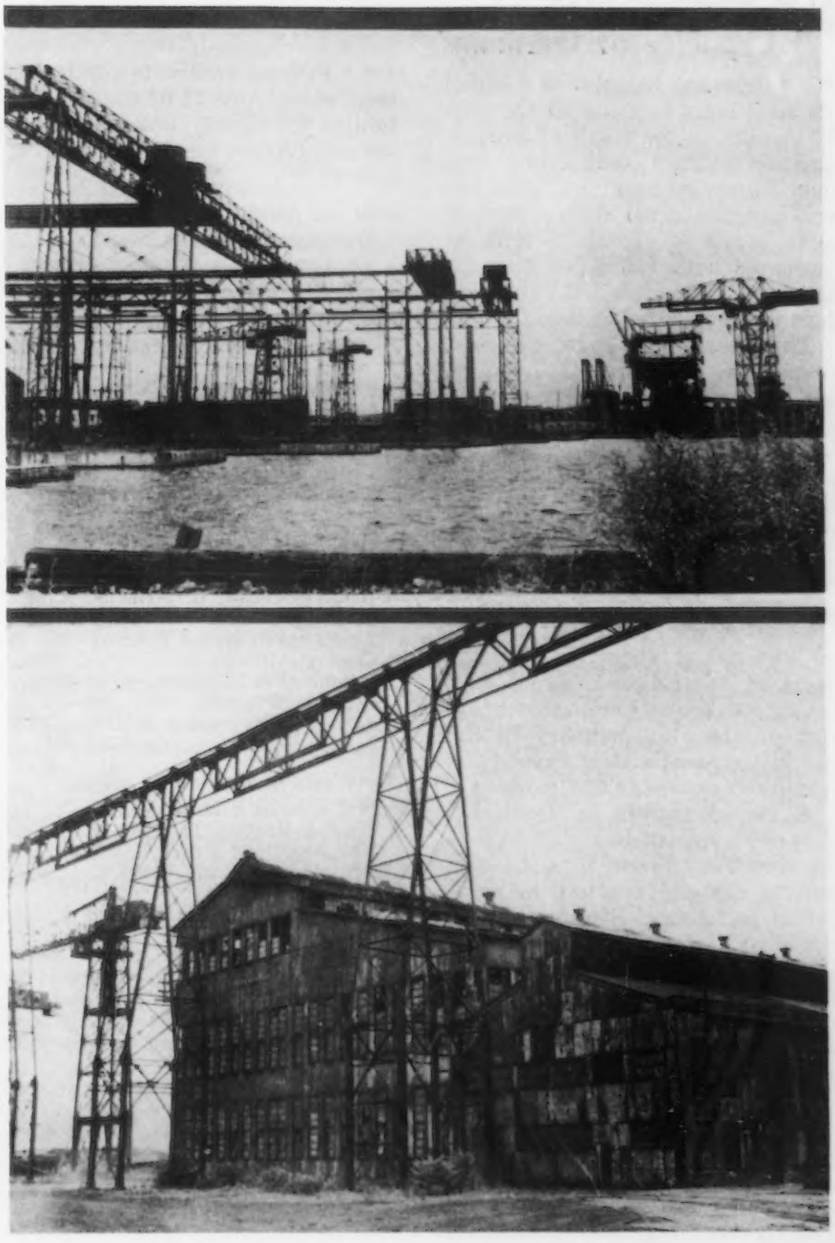
• • • **Shipments of** finished steel products by subsidiary companies of U. S. Steel Corp. in August were 1,455,604 net tons, a gain of 158,717 tons over the preceding month and highest since April, 1937. The high point of 1937 was reached in March, when 1,563,113 tons were shipped. August shipments were equal to 88.6 per cent of the corporation's finishing capacity.

Mr. Rose—Not Col. Rose

• • • **Among the comments** published on pages 72-73 of last week's issue, concerning the Toulmin series on national defense, was one signed "Col. W. W. Rose, executive vice-president, Gray Iron Founders' Society, Inc." Mr. Rose telegraphs:

"I GAVE UP BEING A COLONEL TWENTY-ONE YEARS AGO. I HOLD NO MILITARY RANK WHATSOEVER."

He explains by letter, "I severed my connection with the service by resignation in October, 1919, and left under honorable auspices."



THE CRAMP shipyard at Philadelphia, pictured above, this week received a new lease on life when the Pennsylvania Supreme Court upheld a plan to compromise delinquent taxes outstanding against the yard, thus paving the way for its early reopening. The property, which is idle while the United States embarks on the greatest building program in the Navy's history, is to be sold for $260,000 at a sheriff's sale to the Harriman interests. The city of Philadelphia has tax claims amounting to $1,300,000 against the Cramp yard and the Navy has a tax lien of more than $1,000,000. The Navy, however, has agreed to reduce its claim to $100,000 and plans to build four cruisers there at a cost of $72,000,000 to $120,000,000. Rehabilitation of the yard is expected to cost about $5,000,000.

(By International)

War Doubles Steel Capacity of Germany

• • • **Germany has almost** doubled its steel ingot capacity in the past 12 months, as the result of annexation and military occupation of various European countries. The annual capacity of the Reich at present is in excess of 41,000,000 tons, as compared with 14,700,000 tons for the United Kingdom and 79,353,467 tons for the United States.

This increase in ingot capacity, coupled with control of Lorraine and Luxembourg ore deposits and domination of Swedish ore output has greatly improved Germany's position with respect to supplying the need of her highly mechanized war machine.

The 41,000,000-ton capacity is undoubtly on the conservative side as it is based on maximum production attained in the recent past and not on theoretical capacity. On the basis of theoretical capacity, and taking into consideration the expansion of the steel industry in the Reich, Germany's steel capacity is very likely nearer 46,000,000 tons.

A recent article in *Deutscher Volkswirt*, quoted in a despatch to the New York *Times*, lists the steel making capacity acquired by occupation as follows: Belgium, 4,100,000 tons; Eastern France, excluding Lorraine, 3.700,000 tons; Northern France, 1,200,000 tons. Capacity of Poland, Czechoslovakia and Austria, which have been annexed by Germany, are included with Greater Germany in the article.

Annual iron ore output of territories which have been, or will be incorporated into the German customs union are put at 32,300,000 tons by the *Deutscher Volkswirt*, distributed (in tons) as follows: The old Reich, 22,700,000 tons; Austria, 900,000 tons; Upper Silesia. 1,300,000; Bohemia and Moravia, 1,700,000; Luxembourg, 2,670,000; Eastern part of Lorraine, 3,000,000.

U. S. Contracts for Machine Gun Plant Costing $17,600,000

Washington

• • • **The War Department** has announced the award of a contract on a cost-plus-fixed-fee basis to the Savage Arms Corp., Utica, N. Y., for the equipping of a machine gun plant at an approximate cost of $17,600,000.

. . . Government

• • • **Federal contracts** for iron and steel products, as reported for the week ended Aug. 31 by the Labor Department's Public Contracts Division, totaled $2,389,031. For the same period contracts aggregating $1,387,282 for non-ferrous metals and alloys; and $2,606,590 for machinery. Details follow:

Iron and Steel Products

National Tube Co., Ellwood City, Pa., steel tubing, $52,235.
Vacuum Can Co., Chicago, vacuum carriers, $62,560.
The Foundry Equipment Co., Cleveland, core and mold ovens, $26,400.
Morris, Wheeler & Co., Inc., Philadelphia, steel, sheet, flat, $120,514.
Harrisburg Steel Corp., Harrisburg, Pa., gas cylinders, $36,116.
Treadwell Construction Co., Midland, Pa., gates and hoisting equipment, $39,192.
Peco Mfg. Corp., Philadelphia, forgings-machining, $295,000.
Lansdowne Steel & Iron Co., Morton, Pa., forgings, shell, $133,518.
Struthers Wells-Titusville Corp., tube forgings, $36,078.
National Forge & Ordnance Co., Irvine, Pa., tube forgings, $39,685.
Crucible Steel Co. of America, New York City, tube forgings, $40,587.
The Aluminum Cooking Utensil Co., New Kensington, Pa., parts for field ranges, $358,785.
Crane-O'Fallon Co., air-inlet piping, $27,000.
Dzus Fastener Co., Inc., Babylon. N. Y., fasteners, grommets, $28,616.
Bethlehem Steel Co., Bethlehem, Pa., forgings, $35,354.
Air Associates, Inc., Garden City, N. Y., bolts, steel, clevis and eye, $25,881.
C. J. Rainear & Co.. Inc., Philadelphia, wrought iron pipe. $101,264.
The Timken Roller Bearing Co., Canton, Ohio, steel alloy, bar, $40,939.
Carnegie-Illinois Steel Corp., Pittsburgh, steel, $135,980.
Combustion Engineering Co., Inc., New York City, acid manufacture equipment, $376,000.
Joseph T. Ryerson & Son, Inc., Chicago, steel, carbon, bar stock, $64,090.
Judson Steel Corp., Oakland, Cal., reinforcement bars, $44,756.

Non-Ferrous Metals and Alloys

Matthiessen & Hegeler Zinc Co., LaSalle, Ill., rolled zinc, $34,401.
Reed & Barton, Taunton, Mass., silver-plated ware, $52,987.
The American Brass Co., Waterbury, Conn., bullet jacket cups, $91,617.
Aluminum Co. of America, Cleveland, castings, aluminum alloy and bronze, $76,315.
Wright Aeronautical Corp., Paterson, N. J., castings, aluminum alloy and bronze, $125,568.
Caswell, Strauss & Co., Inc., New York City, pig tin, $258,150.
Mueller Brass Co., Port Huron, Mich., rolled brass, $156,423.
The American Brass Co., Waterbury, Conn., brass, bronze and copper. $310,398.
International Silver Co., New York City, silver-plated ware. $46,756.
The American Brass Co., Waterbury, Conn., copper tubing, $27,216.

Machinery

The G. A. Gray Co., Cincinnati, open side planer, $27.258.
Lidgerwood Mfg. Co., Elizabeth, N. J., steering gear, $41,238.

Central Iron & Coal Properties Are Sold

Birmingham

• • • **Sale of certain** properties of the Central Iron & Coal Co. of Holt, Ala., to the Associated Metals & Minerals Corp., 40 Rector Street, New York, for $180,000 was confirmed in Federal Court here Sept. 4 by Judge T. A. Murphree.

The sale confirmation included the Kellerman coal mines, the iron mines at Giles, Ala., and a blast furnace and by-products coke plant at Holt. None of the property has been in operation during the past eight years.

Bid of the Associated Metals & Minerals Corp. was the only one offered. Appraisers appointed by the court had valued the properties at $245,000. Properties of the Central Iron & Coal Co. not included in the transaction and still to be sold are the mill village at Holt, containing about 390 houses and 100 acres of land on Red Mountain, famed for its iron ore deposits.

The Central Iron & Coal Co., a former subsidiary of the Central Foundry Co., has been in general equity receivership since the first of this year.

Contracts . . .

Bucyrus-Erie Co., South Milwaukee, Wis., shovels, $115,370.
The Euclid Road Machinery Co., Cleveland, hauling equipment, $154,000.
Allis-Chalmers Mfg. Co., Milwaukee, turbine and governor, $605,000.
Allis-Chalmers Mfg. Co., Milwaukee, turbines and governors, $364,000.
R. L. Harris, Inc., Knoxville, Tenn., tournapulls with scrapers, $75,000.
Sullivan Machinery Co., Knoxville, Tenn., air compressors, $45,000.
R. L. Harris, Inc., Knoxville, Tenn., rock hauling units, $102,400.
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford, die sinking machines, $38,564.
The Thompson, Grinder Co., Springfield, Ohio, grinding machines, $46,200.
Kearney & Trecker Corp., Milwaukee, milling machines, $29,002.
Morton Mfg. Co., Muskegon Heights, Mich., machine, propeller, profiling, $113,000.
Vickers, Inc., Detroit, hydraulic pumps, $185,754.
Lidgerwood Mfg. Co., Elizabeth, N. J., windlass, anchor, $64,753.
The Lapointe Machine Tool Co., Hudson, Mass., broaching equipment, $73,657.
Davenport Machine Tool Co., Inc., Rochester, N. Y., screw machines, $34,863.
Benrus Watch Co., Inc., New York City, gears, $33,000.
William Sellers & Co., Inc., Philadelphia, drilling machine, $35,805.
Marshall & Huschart Machinery Co. of Indiana, Indianapolis, milling machines, $30,782.

Contracts have been awarded by the Navy Bureau of Supplies and Accounts as follows:

Lidgerwood Mfg. Co., Elizabeth, N. J., gear, steering, electric hydraulic, $846,756.
Gibbs Gas Engine Co. of Florida, Jacksonville, Fla., boats, small. $79,200.
Reed & Prince Mfg. Co., Worcester, Mass., screws, wood, brass, $23,616.
Kearney & Trecker Corp., Milwaukee, Wis., machines, milling, $46,535.
Taylor-Wharton Iron & Steel Co., Easton, Pa., cylinders, gas, shatter-proof, $21,167.
Schutte & Koerting Co., Philadelphia, Pa., pumps, water-jet, $24,772.
The Thew Shovel Co., Lorain, Ohio, truck, crane, $13,730.
Brown & Sharpe Mfg. Co., Providence, R. I., machines, grinder, $14.736.
Baldt Anchor Chain & Forge Corp., Chester, Pa., anchors, cast steel, $56,700.
Gary Steel Products Corp., Norfolk, Va., buoys, mooring. $15,990.
Lindberg Engineering Co., Chicago, Ill., furnaces, electric, $11,320.
Wadell Engineering Co., Newark, N. J., fixtures, rod boring, $11,193.47.
Curtiss Wright Corp., Curtiss Aeroplane Div., Buffalo, airplanes, $11.476.633.
United States Pipe & Foundry Co., Philadelphia, Pa., pipe. water, $89,837.86.
Buffalo Bolt Co., North Tonawanda, N. Y., bolts, $10,140.35.
Link-Belt Speeder Corp., Chicago, Ill., cranes, crawler type, $19,378.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., bolts and nuts, $52,911.46.
National Machine Products Co., Detroit, Mich., nuts, brass, $21,504.28.
Standard Nut & Bolt Co., Valley Falls, R. I., bolts, $13.664.24
Ingersoll-Rand Co., Washington, D. C., compressors, air, $720,765.

National Steel Corp. Adds 25¢ to Dividend

Pittsburgh

• • • **National Steel Corp.** has declared a dividend of 75c. a share on its capital stock for the third quarter of 1940, payable Sept. 30 to stockholders of record Sept. 20. This dividend represents an increase of 25c. a share per quarter over the previous rate which was on a $2 annual basis. The action by the directors places the corporation's stock on a $3 annual basis.

A. J. Walsh Heads Liaison Office for Procurement

Washington

• • • **Establishment of** a new liaison office between the 43 field procurement officers and the procurement division in Washington has been announced by the Treasury Department. This new office, designated as the field inspection division, began operation on Sept. 3. A. J. Walsh, chief of the emergency branch, formerly in charge of the regional procurement office at Boston, will have supervision of the field inspection division.

Industrial Advertisers to Work for Defense

Detroit

• • • **A program mobilizing** the resources of industrial advertising and marketing, and directing its energies nationally towards achievement of America's defense objectives, has been outlined for the 18th annual Conference of the National Industrial Advertisers Association, Sept. 18-20, at Hotel Statler. Two general sessions and a series of clinic meetings will be staged during the three days.

"Make America Strong!" is the theme around which the conference has ben planned. Advertising and marketing experts representing the nation's leading industrial companies will meet to decide on the action each can take so he can make the most of his opportunities to contribute to making America strong.

Speakers at the conference opening session on Wednesday, Sept. 18, will be: Lionel D. Edie, economist; John Abbink, president, Business Publishers International Corp.; Judge Robert Porter Patterson, assistant Secretary of War; Edward J. Noble, recently Under Secretary of Commerce; Walter H. Gebhart, Henry Disston & Sons, Inc., Philadelphia, and Harry W. Fortey, of Warner & Swassey Co., Cleveland; J. M. McKibbin, of Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and Philip Wilcox, Keuffel & Esser Co., Newark, N. J.

An "industry" conclave of chief executives in representative national advertising groups has been scheduled for Friday, Sept. 20, the final day of the conference. Raoul E. Desvernine, president of the Crucible Steel Co. of America, will address this final general session.

Baltimore Purchasing Agents Exhibit Oct. 22-24

• • • **The Fifth Annual** Manufacturers' Products Exhibit, sponsored by the Purchasing Agents' Association of Baltimore, will be held Oct. 22, 23 and 24 at the Lord Baltimore Hotel, Baltimore, Md. There will be approximately 100 booths displaying mill, factory and office equipment. Prizes will be given for the most informative, as well as the most attractive and decorative booths. Frank H. Carter, of the Maryland Drydock Co., is general chairman.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **Charles F. Dickinson,** formerly assistant to the general superintendent of the Gary sheet and tin mills, Carnegie-Illinois Steel Corp., has been appointed manager of the sheet and strip bureau, metallurgical division, Chicago. He succeeds **Maurice B. Sunderland,** who has been transferred to the Pittsburg office as metallurgical engineer handling sheet and strip. **Paul R. Lawrence,** who has been manager of the tin plate bureau, metallurgical division, Chicago, since 1936, will become assistant to the general superintendent of the Gary sheet and tin mills succeeding Mr. Dickinson.

Charles H. Jackman becomes manager of Carnegie-Illinois' structural and plate bureau, metallurgical division, Chicago, the position formerly held by **Earl H. Davidson,** who goes to Pittsburgh as metallurgical engineer, handling structural and plate. Mr. Jackman has been a Chicago contact representative of this bureau since 1936. **John N. Crombie** has been made manager of the tin plate bureau, metallurgical division, Chicago, after serving as contact representative of this bureau for four years. **Elmer Gammeter** becomes manager of the stainless steel bureau, metallurgical division, Chicago. He has been contact representative since 1937.

• **Carl H. Youngdahl** has been appointed assistant superintendent of the power division of the South works of the Carnegie-Illinois Steel Corp. He goes to South works from the Illinois-Iowa Power Co. where he was division engineer in charge of operation, maintenance and construction since 1928.

Charles L. Clarke has been made superintendent of yards and transportation. He has been employed at South works since 1896 when he began as a switchman. He was assistant superintendent of yards and transportation at the time of his appointment.

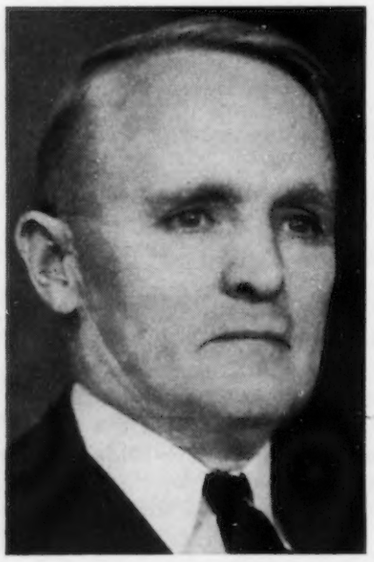
Russell W. Davy receives the post of construction engineer after serving in various capacities in the civil engineering department. During a lapse in service between 1931 and 1937, Mr. Davy was superintendent of engineering at the Chicago Century of Progress and construction engineer for Wilson & Co.

Howard C. Brown becomes assistant superintendent of yards and transportation succeeding Mr. Clarke. He was assistant to the superintendent of this department in charge of personnel until the present time.

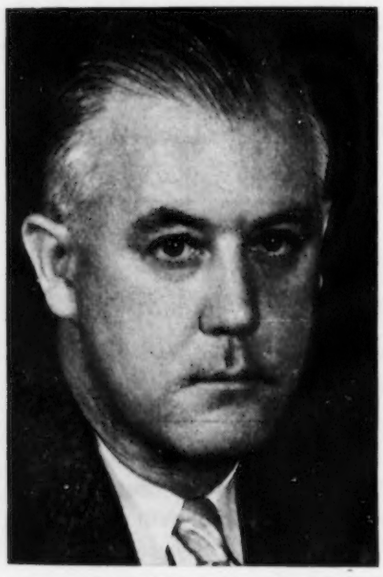
• **Ralph O. Wirtemburg,** formerly manager of the New York office, has gone to the main office of the New Departure division of General Motors Sales Corp. in Bristol, Conn., as Eastern sales manager, a new post created by New Departure. **Francis B. Wasley,** in charge of the Philadelphia office, was shifted to succeed Mr. Wirtemburg in New York; and **Mark Goedecke,** service engineer in the Bristol office, was made chief of the Quaker City office.

• **H. A. Myers** has been appointed assistant branch manager of the Gar Wood factory branch, Long Island City, New York, according

A. J. HULSE has been appointed chief engineer of South Works, Carnegie-Illinois Steel Corp., as announced in these columns last week.



J. F. BROWN has been made construction engineer for the Chicago district of the Carnegie-Illinois Steel Corp., as announced last week.



H. A. MYERS, assistant branch manager of the Long Island City plant of Crosley Corp.

to a recent announcement made by W. H. Hammond, sales manager of the Hoist and Body Division of Gar Wood Industries, Inc., Detroit.

• **Herbert E. Smith** has been appointed vice-president of the Vulcan Rivet & Bolt Corp., Inc., Tarrant, Ala., and has taken over the duties of the late W. C. Martin, president of the company, who died July 18. Mr. Smith, formerly with Woodward Iron Co., served as secretary of that company from 1915 to 1935.

• **Carroll L. Proctor** of the Toledo Edison Co. and **C. E. Swartzbaugh** of the Swartzbaugh Mfg. Co., Toledo, Ohio, have been appointed chairmen of the two industrial committees of the Toledo Chamber of Commerce, according to **Sydney D. Vinnedge,** president. Mr. Proctor will be in charge of the development committee and Mr. Swartzbaugh of the manufacturers committee.

• **George S. Jameson,** purchasing agent for the River works, General Electric Co., Lynn, Mass., will retire after 52 years of continuous service with the General Electric Co. Mr. Jameson started as an office boy in 1888 in what was then the Thompson Houston Electric Co. After holding various positions in the accounting and purchasing departments, he was appointed assistant to the supervisor of order and stores. In 1918 he became supervisor of order and stores, the position he has held until the present day.

• **W. H. Dick,** assistant to chief operating officer, Rock Island Lines, Kansas City, now on leave of absence, will retire Oct. 1, after 39 years with the road. Mr. Dick began his railroad career as telegraph operator and train dispatcher at Chickasha, Okla. He was promoted to trainmaster at Haileyville, Okla., in 1914, transferred to Eldon, Mo., and then to Topeka, Kan., and in 1929 was made superintendent at Fairbury, Neb. In 1939 he was advanced to general superintendent at Des Moines and on June 1, 1939, made assistant to chief operating officer at Kansas City.

• **L. W. Downey,** supervisor of automotive equipment for the Rock Island for the past three years, has been appointed by the United States Navy as engineer of maintenance and engine casualties, bureau of ships, diesel section, with headquarters in Washington. Mr. Downey had been in charge of maintenance of the diesel engines of the Rock Island Rockets as well as the fleet of 50 diesel switch engines. In his new position he will supervise the maintenance and operation of the diesel engines on submarines and other naval vessels. Mr. Downey's first diesel experience was gained with the Electro-Motive Corp., LaGrange, Ill.

• **Chester H. Norton,** purchasing agent at the Boston works, of Allis-Chalmers Mfg. Co., has been appointed assistant general manager of purchases at the company's main offices at Milwaukee, where he will assist Fred E. Haker, general manager of purchases. Mr. Norton was graduated from the engineering school of Maine University in 1915. He served in the U. S. Navy as assistant naval constructor, lieutenant junior grade, during the World War, after which he successively occupied positions of purchasing agent for several companies in the East. He was purchasing agent for the former Condit Electrical Mfg. Co. of Boston when Allis-Chalmers acquired that plant in 1930.

H. W. Hauser, formerly with company's purchasing department in Milwaukee, will succeed Mr. Norton as purchasing agent at the Boston works.

• **E. S. Bonnet** has been appointed first assistant purchasing agent of the New York Central Railroad, the Indiana Harbor Belt Railroad and the Chicago River & Indiana Railroad in charge of fuel coal and forest products. **E. O. Hornig** has been appointed assistant purchasing agent in charge of miscellaneous materials.

• **Sinding Larsen** has been elected a director of the Pittsburgh Piping & Equipment Co. Mr. Larsen joined Pittsburgh Piping in 1924 and was appointed chief engineer in 1938.

• **Milton P. Higgins,** resident manager of the Norton electric furnace plant at Chippawa, Ont., for the past two years, has been transferred to the Worcester headquarters as assistant manager of abrasive production and research. Mr. Higgins has been with the Norton Co. for about 12 years. Previous to the Chippawa post, he was manager of sales research at Worcester and in special sales work in the Chicago territory. He is a director of Norton Co. and also of its Behr-Manning division.

Obituary

• **John McC. Wilson,** chairman of the board, National Supply Co., Pittsburgh, died at his home in Pittsburgh Sept. 6, aged 64 years. Mr. Wilson joined National Supply at Beaumont, Tex., in 1900 after graduating from Bucknell University and Harvard Law School, but left the company two years later to join the Franklin Trust Co. In 1908 he rejoined National Supply, becoming president in 1924 and several years later also became president of Spang Chalfant & Co., which was fully merged with National Supply in 1937. In 1939 Mr. Wilson was elected chairman.

• **William Thomas Smith,** one of the founders, at various times foreign sales representative, assistant treasurer, president and chairman of the board of the H. B. Smith Co., Westfield, Mass, died Aug. 25. He was 82 years old.

• **George Taylor Bishop,** 75, retired Cleveland financier, died Aug. 24. Mr. Bishop was connected with many prominent industrial companies and had been a director of Youngstown Sheet & Tube Co.

• **Fred K. Gatch,** 74, former assistant treasurer of the Grasselli Chemical Co., Cleveland, now a division of E. I. du Pont de Nemours & Co., Inc., died Aug 29 in Cleveland after a long illness at St. Luke's Hospital.

• **L. Stewart Love,** who for many years was engaged in the machine tool business as a dealer in Philadelphia and New York and for the past several years sales engineer in New York for the Edward G. Budd Mfg. Co. of Philadelphia, died Sept. 5 at the Nassau Hospital, Mineola, L. I., after a month's illness. Some years ago, Mr. Love was a frequent contributor of articles to THE IRON AGE. He resided at 150 Schenk Avenue, Great Neck, L. I.

August Pig Iron Production Rate at 90.4% of Capacity

PRODUCTION of coke pig iron in August totaled 4,238,041 net tons, compared with 4,053,945 net tons in July. On a daily basis the gain was 4.5 per cent over that in July, or from 130,772 tons to 136,711 tons in August, the third highest on record, being exceeded only by output in November last year, at 138,877 net tons daily, and the record figure of 140,834 tons reached in May, 1929. The operating rate for the industry was 90.4 per cent, against 86.3 per cent in July.

Output in August Totaled 4,238,041 Tons. Gain in Daily Output of 4.5%

There were 190 furnaces in blast on Sept. 1, operating at the rate of 137,500 tons a day, compared with 187 on Aug. 1, making 131,760 tons. Independent producers blew in five furnaces and took one off blast, merchant producers took one furnace out of production and the United States Steel Corp. made no furnace changes.

Among the furnaces blown in were: One Susquehanna, National Steel Corp; one Bethlehem, Bethlehem Steel Co.; Martins Ferry furnace of Wheeling Steel Corp.; one Otis Steel Co. unit, and Madeline No. 2, Inland Steel Co.

Furnaces blown out or banked included Hamilton No. 2 of American Rolling Mill Co. and Rockdale furnace of Tennessee Products Corp.

Production by Districts and Coke Furnaces in Blast

(All Figures in Net Tons)

FURNACES	August, 1940	July, 1940	August, 1939	Sept. 1, 1940: Number in Blast	Sept. 1, 1940: Operating Rate, Net Tons a Day	Aug. 1, 1940: Number in Blast	Aug. 1, 1940: Operating Rate, Net Tons a Day
New York:							
Buffalo	279,994	268,610	213,549	12	9,070	11	8,665
Other New York and Mass.	37,227	13,189	17,664	2	1,200	2	815
Pennsylvania:							
Lehigh Valley	97,153	91,771	62,771	6	3,510	5	2,960
Spiegeleisen	4,285	4,731	4,609	1	140	1	155
Schuylkill Valley	45,342	44,292	28,524	3	1,465	3	1,430
Susquehanna and Lebanon Valleys	47,322	43,511	14,536	2	1,525	2	1,405
Ferromanganese	3,022	3,045	.....	1	95	1	100
Pittsburgh District	903,340	878,807	605,970	38	29,140	37	28,760
Ferro. and Spiegel	11,856	14,360	5,901	2	380	3	465
Shenango Valley	78,978	70,043	16,507	4	2,550	4	2,370
Western Penna.	119.230	115,230	65,150	6	3,845	6	3,715
Ferro. and Spiegel	13,949	14,470	9,915	1	450	1	465
Maryland	195,441	190,835	184,783	6	6,305	6	6,155
Wheeling District	156,502	151,385	148,676	7	5,340	6	4,885
Ohio:							
Mahoning Valley	456,598	420,913	323,823	18	14,730	18	13,435
Central and Northern	366,759	323,950	310,729	16	11.855	15	10,600
Southern	56,567	66,154	40,958	4	1,715	5	2,135
Illinois and Indiana	860,367	836,452	545,170	31	27,955	30	26,980
Michigan and Minnesota	124,790	123,729	73,506	6	4,025	6	3,990
Colorado, Missouri and Utah	45,263	53,489	49,395	3	1,460	3	1,725
Ferromanganese	4,407	3,818	.....	1	140	1	120
The South:							
Virginia	.....	.....	.....	0	....	0	....
Ferromanganese	.....	3,135	3,084	0	....	0	....
Kentucky	29,643	28,543	28,656	2	955	2	920
Alabama	296,237	283.679	217,959	17	9,555	16	9,325
Ferro. and Spiegel	2,888	4,197	7,147	1	95	2	135
Tennessee	881	1,607	.....	0	....	1	50
Total	4,238,041	4,053,945	2,978,982	190	137,500	187	131,760

Production of Coke Pig Iron and Ferromanganese

(All Figures in Net Tons)

	Pig Iron* 1940	Pig Iron* 1939	Ferromanganese† 1940	Ferromanganese† 1939
January	4,032 022	2,436,474	43,240	23,302
February	3,311,480	2.307,409	38,720	20,894
March	3,270,499	2,681,969	46.260	17,928
April	3.137,019	2,302,918	43,384	12,900
May	3,513,683	1,923.618	44,973	8,835
June	3,818,897	2,372,665	44,631	18,611
½ year	21,083.600	14,025,053	261,208	102,470
July	4,053,945	2,639 022	43,341	23,758
August	4,238,041	2,978.991	37,003	23,103
September	.....	3,223,983	....	24,583
October	.....	4,062,901	....	26,817
November	.....	4,166,888	....	33,999
December	.....	4,220,536	....	40,654
Year	.....	35,317,374	....	275,384

*These totals do not include charcoal pig iron. †Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	1940	% Capacity	1939	% Capacity	1938
January	130,061	85.8	78,596	51.5	51,632
February	114,189	75.1	82 407	54.0	51,931
March	105,500	68.9	86,516	56.8	52,476
April	104,567	68.6	76,764	50.4	51,376
May	113,345	74.8	62,052	40.8	45,343
June	127,297	83.9	79,089	51.7	39,648
½ year	115.844	76.1	77,486	...	48,717
July	130,772	86.3	85,130	55.8	43,417
August	136,711	90.4	96,096	62.9	53,976
September	.....	...	107,466	70.4	62,737
October	.....	...	131,061	85.9	74,147
November	.....	...	138,877	90.9	84,746
December	.....	...	136,146	89.4	79,872
Year	.....	...	96,760	...	57,633

Merchant Iron Made, Daily Rate

	1940	1939	1938	1937	1936
January	16,475	11,875	11,911	18,039	11,801
February	14,773	10,793	9,916	18,496	12,652
March	11,760	10.025	9 547	18,432	12,131
April	13,656	9,529	9,266	16,259	15,565
May	16,521	7,883	7,203	21,821	14,352
June	13,663	8 527	6.020	17,774	15,914
July	16,619	9,404	6,154	21,962	13 013
August	17,395	11,225	7,408	19,971	13,606
September	....	12,648	12.550	22,473	14.029
October	....	16.409	12,095	21,224	15,282
November	....	16,642	14,793	17,541	16,508
December	....	16,912	10,226	12,280	16,634

EXPORT TONNAGE 20% OF STEEL PRODUCED IN JULY

OF the semi-finished and finished steel produced for sale by the industry in July, about 20 per cent was export tonnage, according to the monthly report of the American Iron and Steel Institute. The total output of semi-finished and finished steel for sale was 4,173,839 net tons, of which 835,385 tons was rolled for export. The largest export item was semi finished steel, totaling 353,882 tons. Bars for export totaled 87,383 tons, sheets 74,419 tons, plates (not including skelp) 68,209 tons and wire rods 38,180 tons. The seven-months' total of semi-finished and finished steel produced for sale was 24,896,782 tons and the export tonnage for the same period was 3,606,186 tons. The export figures do not quite agree with those of the Department of Commerce which represent shipments, while those of the Institute are for material produced. Moreover, the government figures are in gross tons and those of the Institute in net tons.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

July - 1940

		Number of companies	Items	Annual Capacity Net tons	Production for Sale—Net Tons: Current Month: Total	Current Month: Per cent of capacity	Current Month: Shipments: Export	Current Month: Shipments: To members of the industry for conversion into further finished products	To Date (7 Months 1940): Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	33	1	xxxxxxx	551,332	xxx	353,882	91,124	2,578,300	xxx	1,074,435	609,640
	Heavy structural shapes	8	2	5,205,300	285,599	64.9	51,164	xxxxxxx	1,440,374	47.5	149,530	xxxxxxx
	Steel piling	4	3	328,000	13,027	47.0	1,478	xxxxxxx	92,029	48.2	9,375	xxxxxxx
	Plates—Sheared and Universal	20	4	6,095,450	360,564	70.0	68,209	1,878	2,146,790	60.5	312,147	12,264
	Skelp	8	5	xxxxxxx	83,891	xxx	15,875	26,672	376,288	xxx	56,507	144,939
	Rails—Standard (over 60 lbs.)	4	6	3,647,600	118,179	38.3	41,022	xxxxxxx	1,024,756	48.3	82,895	xxxxxxx
	Light (60 lbs. and under)	6	7	306,800	9,567	36.9	2,337	xxxxxxx	60,350	33.8	18,126	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	118,000	401	4.0	-	xxxxxxx	16,901	24.6	2,382	xxxxxxx
	Splice bar and tie plates	15	9	1,300,200	39,828	36.2	1,604	xxxxxxx	353,887	46.8	6,149	xxxxxxx
	Bars—Merchant	35	10	xxxxxxx	400,200	xxx	58,277	33,205	2,339,875	xxx	269,731	183,537
	Concrete reinforcing—New billet	15	11	xxxxxxx	122,671	xxx	20,289	xxxxxxx	683,286	xxx	164,685	xxxxxxx
	Rerolling	18	12	xxxxxxx	13,258	xxx	259	xxxxxxx	81,879	xxx	4,517	xxxxxxx
	Cold finished—Carbon	18	13	xxxxxxx	57,619	xxx	1,599	xxxxxxx	360,922	xxx	8,570	xxxxxxx
	Alloy—Hot rolled	15	14	xxxxxxx	83,255	xxx	6,274	6,636	492,911	xxx	33,804	34,017
	Cold finished	14	15	xxxxxxx	7,381	xxx	132	xxxxxxx	50,014	xxx	1,492	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	8,274	xxx	553	xxxxxxx	53,911	xxx	4,887	xxxxxxx
	TOTAL BARS	53	17	12,372,465	692,658	66.2	87,383	39,841	4,062,798	56.4	487,686	217,554
	Tool steel bars (rolled and forged)	15	18	110,220	5,319	57.1	518	xxxxxxx	38,201	59.5	2,907	xxxxxxx
	Pipe and tube—B. W.	13	19	1,815,860	104,108	67.8	4,773	xxxxxxx	540,103	51.1	44,990	xxxxxxx
	L. W.	10	20	1,246,340	34,261	32.5	3,340	xxxxxxx	192,588	26.5	21,126	xxxxxxx
	Electric weld	5	21	735,520	35,662	57.3	2,215	xxxxxxx	154,868	36.2	14,806	xxxxxxx
	Seamless	15	22	3,159,840	152,018	56.9	14,086	xxxxxxx	1,002,721	54.5	101,722	xxxxxxx
	Conduit	6	23	151,145	6,283	49.2	235	xxxxxxx	38,060	43.3	1,045	xxxxxxx
	Mechanical Tubing	13	24	554,825	24,353	51.9	2,906	xxxxxxx	152,570	47.2	10,465	xxxxxxx
	Wire rods	19	25	xxxxxxx	116,599	xxx	38,180	19,144	604,155	xxx	165,870	98,238
	Wire—Drawn	37	26	2,255,210	118,857	62.3	11,573	928	771,925	58.8	93,900	6,188
	Nails and staples	19	27	1,091,690	61,377	66.5	6,723	xxxxxxx	340,942	53.7	40,075	xxxxxxx
	Barbed and twisted	16	28	438,270	19,944	53.8	5,297	xxxxxxx	121,367	47.6	25,456	xxxxxxx
	Woven wire fence	15	29	772,790	20,657	31.6	194	xxxxxxx	149,980	33.3	1,404	xxxxxxx
	Bale ties	11	30	119,050	9,048	89.9	1	xxxxxxx	39,215	56.6	144	xxxxxxx
	All other wire products	6	31	27,030	2,025	88.6	-	xxxxxxx	8,250	52.4	-	xxxxxxx
	Fence posts	13	32	147,485	4,689	37.6	47	xxxxxxx	32,896	38.3	490	xxxxxxx
	Black plate	12	33	653,295	30,021	54.4	10,807	377	218,519	57.5	29,982	55,670
	Tin plate—Hot rolled	9	34	1,201,960	38,823	38.2	4,821	xxxxxxx	296,551	42.4	67,381	xxxxxxx
	Cold reduced	10	35	2,930,860	200,002	80.7	20,466	xxxxxxx	1,368,003	80.2	247,035	xxxxxxx
	Sheets—Hot rolled	26	36	xxxxxxx	476,206	xxx	51,415	16,031	2,960,589	xxx	307,187	85,945
	Galvanized	16	37	xxxxxxx	134,313	xxx	14,047	xxxxxxx	752,723	xxx	98,680	xxxxxxx
	Cold rolled	18	38	xxxxxxx	171,445	xxx	6,973	xxxxxxx	1,239,895	xxx	52,314	xxxxxxx
	All other	15	39	xxxxxxx	46,156	xxx	1,984	xxxxxxx	320,749	xxx	14,586	xxxxxxx
	TOTAL SHEETS	27	40	13,255,610	828,120	73.9	74,419	16,031	5,273,956	68.4	472,767	85,945
	Strip—Hot rolled	24	41	3,525,110	117,717	39.5	10,346	14,207	782,037	38.1	48,844	81,738
	Cold rolled	35	42	1,313,360	59,529	53.6	1,226	xxxxxxx	390,161	51.0	9,919	xxxxxxx
	Wheels (car, rolled steel)	5	43	424,385	13,495	37.6	84	xxxxxxx	107,787	43.6	2,416	xxxxxxx
	Axles	5	44	472,280	6,053	15.2	1	xxxxxxx	47,332	17.2	1,719	xxxxxxx
	Track spikes	11	45	327,275	9,030	32.6	173	xxxxxxx	66,506	34.9	2,491	xxxxxxx
	All other	3	46	9,100	803	104.4	-	xxxxxxx	5,616	106.0	-	xxxxxxx
	TOTAL STEEL PRODUCTS	134	47	xxxxxxx	4,173,839	xxx	835,385	210,202	24,896,782	xxx	3,606,186	1,312,176
	Estimated total steel finishing capacity based on a yield from ingots of 68.9 %	-	48	53,946,300	xxxxxxx	86.9	xxxxx	xxxxxxx	xxxxxxx	75.1	xxxxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	26	49	xxxxxxx	506,175	xxx	91,679	178,295	3,053,676	xxx	269,102	829,324
	Ingot moulds	4	50	xxxxxxx	39,902	xxx	470	xxxxxxx	236,464	xxx	2,006	xxxxxxx
Iron Products	Bars	10	51	160,600	2,488	18.3	11	274	16,201	17.3	105	1,441
	Pipe and tubes	3	52	109,377	3,985	43.1	40	xxxxxxx	21,598	33.9	581	xxxxxxx
	All other	3	53	71,180	1,369	22.7	479	373	7,261	17.5	1,477	2,017
	TOTAL IRON PRODUCTS (ITEMS 51 to 53)	12	54	276,247	7,842	33.6	530	647	45,060	28.0	2,163	3,458

Total number of companies included - 153

Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current month 3,963,637 *N.T.;* 86.9 *% of Finishing Capacity.*
To date 23,584,606 *N.T.;* 75.1 *% of Finishing Capacity.*
The above tonnages represent 68.9 *% of the ingots produced by companies whose products are included above.*

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Sept. 10, 1940	Sept. 3, 1940	Aug. 13, 1940	Sept. 12, 1939
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.00
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.00
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.40
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	1.92
Skelp (grvd.)	1.90	1.90	1.90	1.90

	Sept. 10, 1940	Sept. 3, 1940	Aug. 13, 1940	Sept. 12, 1939
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

	Sept. 10, 1940	Sept. 3, 1940	Aug. 13, 1940	Sept. 12, 1939
Scrap:				
(Per Gross Ton)				
Heavy melting steel, P'gh.	**$20.25**	$19.00	$18.50	$18.25
Heavy melting steel, Phila.	**20.50**	20.25	19.50	17.25
Heavy melt'g steel, Ch'go	**19.00**	18.625	17.875	14.75
Carwheels, Chicago	**19.75**	19.25	18.25	13.75
Carwheels, Philadelphia	**22.25**	21.25	21.25	17.25
No. 1 cast, Pittsburgh	**20.25**	19.75	19.75	18.25
No. 1 cast, Philadelphia	22.25	22.25	21.25	17.75
No. 1 cast, Ch'go (net ton)	17.25	17.25	16.75	13.75
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$4.75	$4.75	$4.75	$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75
Non-Ferrous Metals:				
(Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.*	**11.50**	11.00	11.00	12.00
Copper, Lake, New York	**11.50**	11.00	11.00	12.00
Tin (Straits), New York	*50.05*	50.50	51.375	75.00
Zinc, East St. Louis	**6.85**	6.50	6.25	6.25
Lead, St. Louis	4.75	4.75	4.60	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 113 to 122 herein.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Sept. 10, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$19.92 a Gross Ton
One week ago	2.261c. a Lb.	$22.61 a Gross Ton	$19.29 a Gross Ton
One month ago	2.261c. a Lb.	$22.61 a Gross Ton	$18.17 a Gross Ton
One year ago	2.236c. a Lb.	$20.61 a Gross Ton	$15.62 a Gross Ton

	FINISHED STEEL High	FINISHED STEEL Low	PIG IRON High	PIG IRON Low	SCRAP STEEL High	SCRAP STEEL Low
1940	2.261c., Jan. 2	2.211c., Apr. 16			$19.92, June 18	$16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Slight moderation in aggregate orders believed to be temporary . . . Steel output for year may break 1929 record . . . August pig iron output 4½ per cent over July . . . National defense requirements spreading; scrap composite hits year's previous high.

NOTWITHSTANDING a slight moderation in the aggregate volume on incoming steel business since the first of the month, as compared with August, steel production this week, estimated at 92½ per cent of capacity, is a full point above the pre-holiday rate and 10½ points above last week.

If steel production over the remainder of the year equals the August rate of 1,361,859 tons weekly, the 1940 total will exceed 64,000,000 net tons, which would be an all-time record, surpassing that of 1929, when the total, exclusive of electric and crucible steel, was 62,132,445 net tons.

Pig iron production this year, if continued at the August rate, may exceed 46,000,000 tons of coke iron, including ferromanganese and spiegeleisen, which would be the second highest on record, the 1929 total of these grades having been 47,159,744 net tons.

The August total of steel ingots, amounting to 6,033,037 net tons, was the third highest on record, ranking next to those of last October and November and within 2 per cent of the November record total of 6,147,783 tons. Last month's average operation was 89.72 per cent of capacity.

PRODUCTION of coke pig iron in August was 4,238,041 net tons compared with 4,053,945 tons in July. The daily rate of 136,711 tons last month was 4½ per cent over the 130,772-ton daily rate of July. The August total was the third highest on record, having been exceeded only in November, 1939, and in May, 1929.

There were 190 furnaces in blast on Sept. 1, only one less than the total on Dec. 1, 1939, and Jan. 1, 1940, but by the latter date the trend of production was downward, while the present trend is still upward. While there are 235 blast furnaces on the potentially active list, some of these are in such a state of disrepair that they may never be operated again even in an emergency. Pig iron production may gain further, however, under the impetus of the national defense program. A possible handicap is coke. By-product coke production is being pushed to the limit and larger output of beehive coke would probably be possible only if higher prices were paid, which would, in turn, push up pig-iron costs. An early freezing on the Great Lakes might force an all-rail movement of ore during the winter.

NATIONAL defense requirements are spreading in total volume and in the number of products affected. For example, wire nails, which have not been in good demand, will be benefited by the purchase of several thousand tons for construction of Army cantonments. Stainless steel, which, on the other hand, is very active, will be spurred by Army and Navy requirements, which include 100 tons for spoons for the conscription army.

The five-billion-dollar defense appropriation, which was immediately followed by the placing of contracts for 200 war vessels of various types, will call for 498,000 tons of plain steel for these ships, deliveries of which, however, will be spread over a number of years. The Navy's requirements will keep armor plants busy for at least five years.

Manufacturers engaged in non-military work are becoming impressed by the longer deliveries which mills are now quoting on a number of products and, accordingly, are maintaining their steel inventories at an average of about 90 days. On those products which are in greatest demand deliveries range from five to six weeks to two months.

WITH Ford and Chevrolet now in production, assemblies of 1941 automobiles will move rapidly into higher totals, and the effect is being felt in steel specifications. Railroad buying is light at the moment, the chief activity of the past week having been the placing of 21 Diesel-electric locomotives, of which 18 are for the Milwaukee Road, but further equipment purchasing is expected soon. Rail orders are also looked for within 30 days, and some roads may specify early deliveries in order to escape delays later if rail mills are used for rolling shell billets.

Fabricated structural steel awards of 35,500 tons and inquiries for 30,600 tons include a good deal of defense work, although 12,000 tons of structural steel was let for a subway in Brooklyn and 14,000 tons on inquiry for elevated highways in Brooklyn.

The continued high rate of activity in steel has boosted scrap prices further. THE IRON AGE scrap composite has this week regained the year's previous high of $19.92, which was recorded in June. No. 1 heavy melting steel is up an average of $1.25 at Pittsburgh, 37.5c. at Chicago, and 25c. at Philadelphia. The National Defense Advisory Commission has recommended to the President that the scrap licensing provision of the May-Sheppard Act be extended to cover other grades than No. 1 heavy melting steel.

The Industrial Pace . . .

A FURTHER MODERATE RISE in activity in the durable goods industries in the past week was indicated by THE IRON AGE index, which rose 2.8 points to 92.2, the highest point reached by the index in seven months. The holiday influence was notable in the dip in steel ingot production, but this was more than offset by a sharp rise in automobile assemblies. The gain in automobile output was so large that, even without allowances for the Labor Day shutdown, the week's daily assembly average was above the preceding full week. Lumber carloadings, which lag one week behind the other components of the index, was slightly higher, as was the Pittsburgh series.

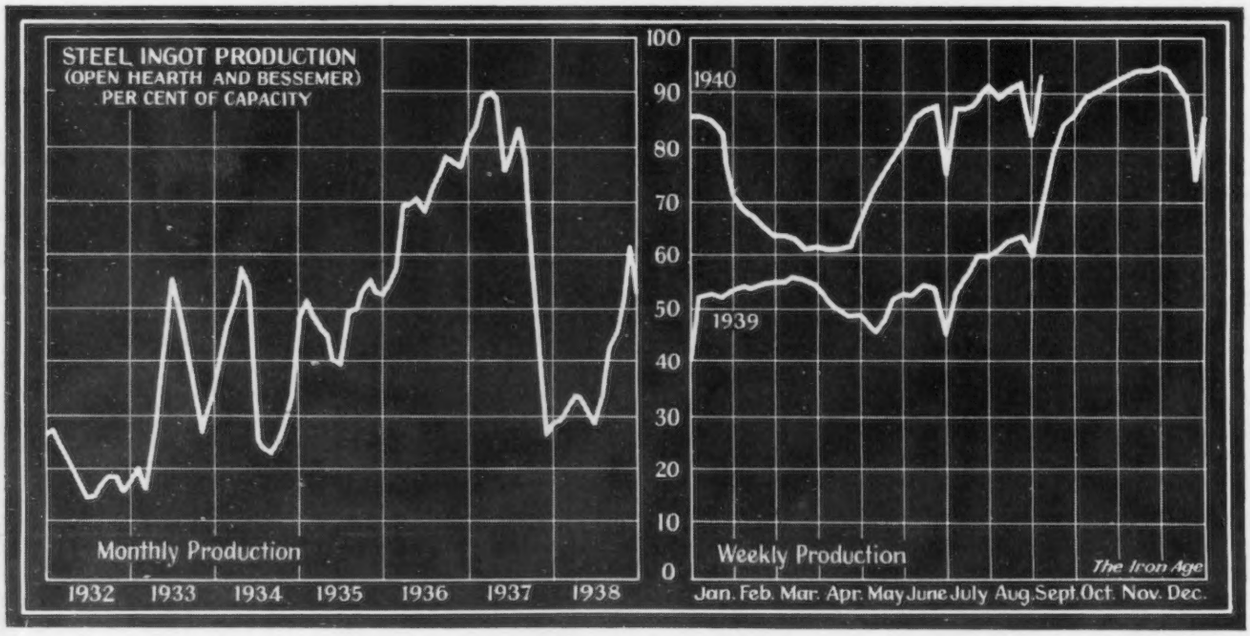
Heavy engineering construction awards in the short week were $19,117,000 above the previous full week, an improvement due almost entirely to defense spending. Public awards for the wek were $58,569,000, against $37,126,000 in the preceding period, while private work slumped to $17,993,000 from $20,318,000. Intensified activity in the construction field under the impetus of the defense program brought August awards to a new 10-year high of $397,253,000.

ADDITIONAL ADVANCES were made at Pittsburgh in the past week according to the Bureau of Business Research of the University of Pittsburgh, whose index figure representing activity in that city rose to 130.5 for the week from 126.3 the week before. Declining in only one week since a steady rise began in April, the Pittsburgh index has risen 35 per cent to a position now only seven points from an all-time high recorded last November.

Carloadings of forest products for the week of Aug. 31 were 38,637 cars, largest since October of last year, and an increase of 599 cars over the previous week's total. Principal factor in the upward movement is the expansion of government activity in the construction industry.

Following a reversal of trend begun early in August, THE IRON AGE composite price of iron and steel scrap has moved steadily upward in the direction of its last peak, established in June of this year. The August composite stood at $18.72 as compared with $18.47 for July and $19.31 for June. In the first week of the present month, the composite stood at $19.29, only 63c. below the June peak.

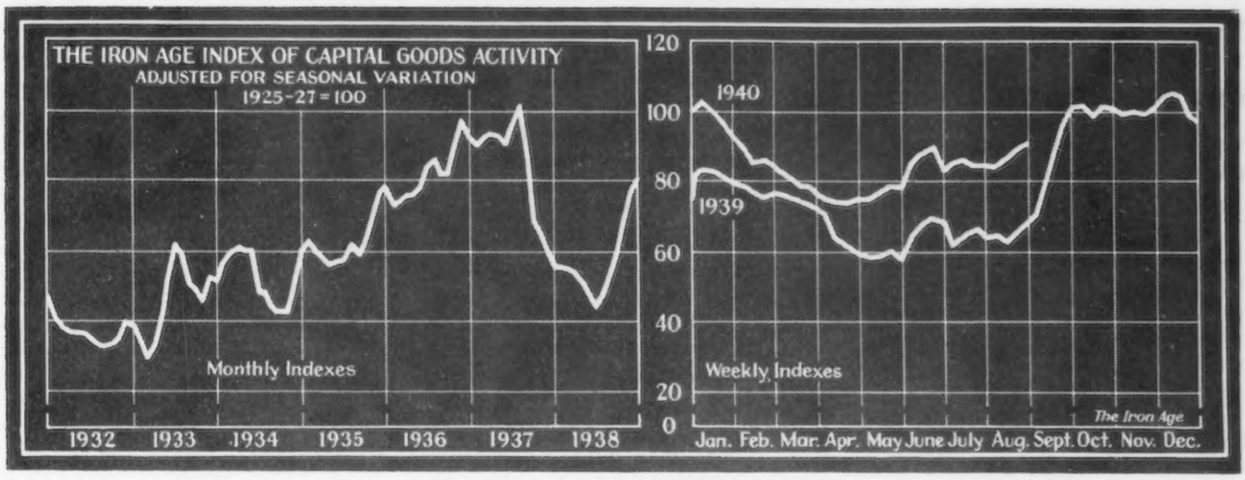
Ingot Rate Recovers to 92.5, New 1940 High



District Ingot Production, Per Cent of Capacity		Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
	Current Week	87.0	97.5	92.0	93.0	88.0	104.5	104.0	100.0	93.0	93.5	68.0	93.5	73.0	**92.5**
	Previous Week	74.0	78.5	83.0*	77.5	80.0	89.5	98.0	85.0	78.0	74.0	55.0	89.0	62.0	**82.0**

*Revised.

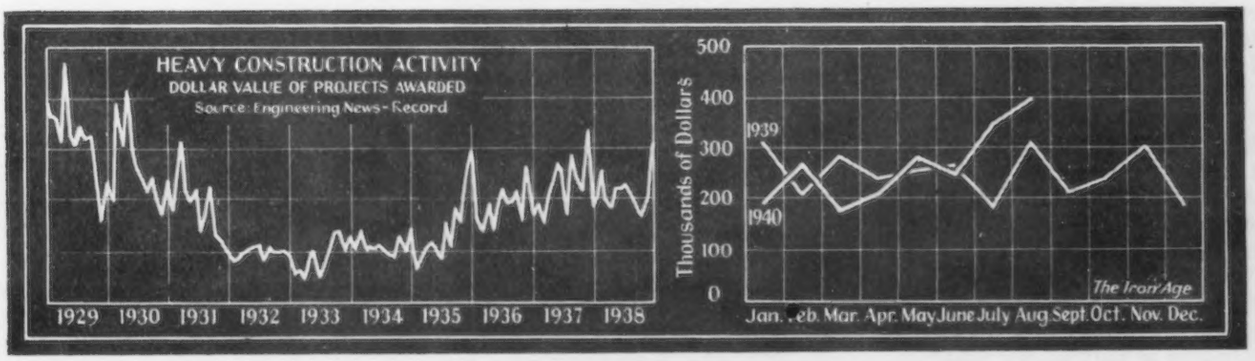
Capital Goods Index Rises to Seven Months' High



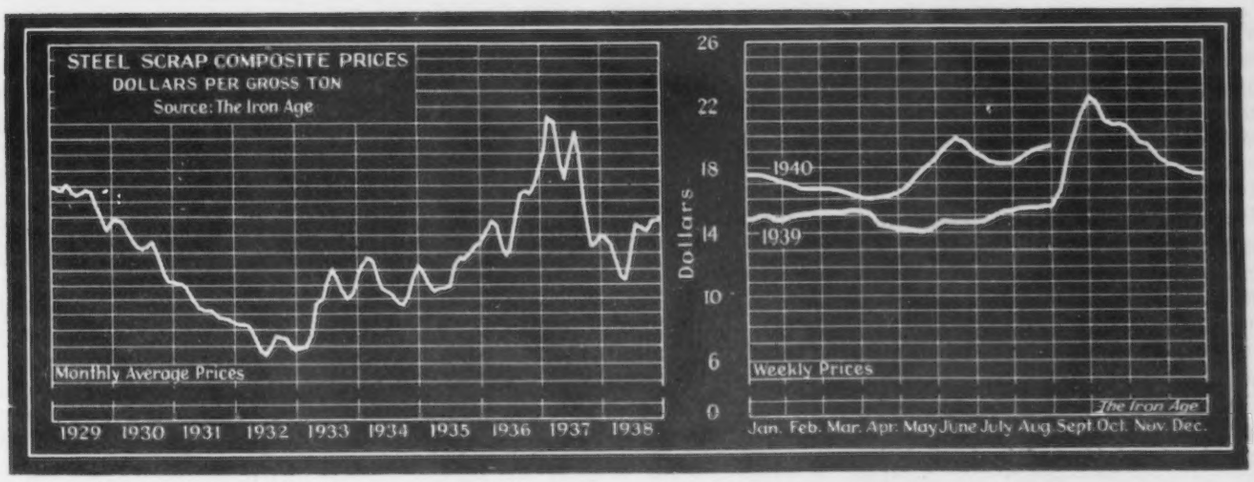
Component — Week Ended →	Sept. 7	Aug. 31	Aug. 10	Sept. 9 1939	Sept. 7 1929
Steel ingot production[1]	123.8	138.9	131.3	89.7	120.7
Automobile production[2]	59.9	34.5	21.0	70.4	96.6
Construction contracts[3]	95.4	95.6	90.3	66.7	121.6
Forest products carloadings[4]	68.9	67.9	67.7	59.3	125.0
Pittsburgh output and shipments[5]	112.8	110.1	110.3	82.9	106.7
COMBINED INDEX	92.2	89.4	84.1	73.8	114.1

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record;* [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Aug. 31. Other indexes cover week of Sept. 7.

Building Awards Push Upward to New 10-Year Peak



Scrap Prices Regain Most of June-July Losses



Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . Total volume moderately lower but much tonnage is ahead

New steel bookings at PITTSBURGH last week were in moderately lower volume than before on account of the Labor Day shutdowns, although on a daily average incoming orders and specifications held up well. In the past 10 days or so, domestic consumers, especially miscellaneous buyers, have begun to increase their placements. Analysis of order books this week shows that a larger proportion of total tonnage is now coming from commercial buyers who are anxious to get on the books in time to assure deliveries of material when needed.

Some producers seriously doubt whether they will be able to provide the same amount of steel for export if domestic takings of bars and semi-finished, including national defense requirements, continue to increase as at present. With shipments of steel to the automotive industry and railroads gaining and still greater demand expected from the national defense program, producers see little chance of a slump in activity during the rest of the year provided the war is prolonged. Bookings of tubular goods, wire, and sheets and strip continue relatively less active than other products, while tin plate is lagging far behind, operations this week being estimated at only 44 per cent.

At most CHICAGO sales offices it is believed that September bookings will show an appreciable increase over August totals. During August backlogs in most cases remained fairly constant, orders and shipments being about on a par. Since Sept. 1, however, backlogs have increased noticeably at some CHICAGO district mills. Bookings are well diversified both as to products and type of industry and, other than a continued trend toward national defense projects, there is no reason to believe that this diversification will not be continued over the remainder of the year.

Demand for shapes, plates and sheets at Chicago is nearing the peak level established in 1937, but activity in other products thus far this year is running behind that period. Considerable additional railroad activity is still probable and the last half peak of production of automobiles is yet to come.

Steel bookings at Cleveland show some falling off as compared with the heavy volume entered during August. Automobile manufacturers are well covered for early requirements for flat rolled steel and mills are being crowded to make shipments as desired. Plant extensions due to national defense requirements are stimulating the demand for structural shapes. Considerable demand is developing for miscellaneous government requirements. Inquiries include 29,900 10-gal. galvanized steel drums for the war department. Heavy demand is expected from plants having government contracts, orders for whose steel requirements have not yet reached the mills.

Defense spending is gradually making itself felt in the NEW YORK area, which heretofore has not experienced any noteworthy support from this source. Erection of new Army barracks at Fort Dix, N. J., will require about 15,000 kegs of nails, 125 tons of pipe and miscellaneous small tonnages of sheets and plates. District interests are also bidding on a substantial quantity of mess spoons for the Army, estimated to require about 100 tons of stainless. General consumer demand in the NEW YORK area has moderated considerably since the holiday, but many consumers manufacturing material not essential for defense purposes are endeavoring to obtain coverage for a part of their 1941 needs as protection against eventuality of priorities. In most cases these consumers are willing to take coverage at prices prevailing at time of shipment.

Initial orders placed in September in the PHILADELPHIA area fell appreciably below the volume of weeks immediately preceding. Producers, however, with an eye to estimated fall requirements, could find little significance in the decline and look forward to a continuance of heavy activity over the remainder of the year. Deliveries on most items have seen some extension here and there of late, chiefly on plates and sheets, but consumers have begun to appreciate the difficulty of early deliveries and are trying to estimate future requirements more carefully.

Shipbuilding activity at Southern yards is having a beneficial effect on the present and prospective rate of steel operations at BIRMINGHAM. This is augmented by railroad car orders coming to Pullman-Standard Car Mfg. Co.'s plant at Bessemer. All of the finishing mills in that territory appear to be running at their approximate full rated capacity. Inquiries continue in good volume for structural steel and fabricated plates. Most of the inquiries are originating from the government's defense program.

The Ensley rail mill of the Tennessee Coal, Iron & Railroad Co., having completed its present schedule for rolling rails, will be used to produce billets and blooms for further conversion, it was announced by the company. Rolling of rails is expected to be resumed the week of Nov. 3.

Prices

. . . New Chemical Extras adopted for hot rolled alloy steels

A revision to the recently issued list of extras on hot rolled alloy steels, effective Oct. 1, has been made in extras for special chemistry, eliminating the 0.10 per cent to 0.15 per cent specified minimum sulphur content range. Under the new setup when sulphur in any form is added, an extra is charged if a range is specified or required. The maximum of the range shall determine the extra. Thus, where maximum sulphur content is 0.06 per cent, the charge is 10c. a lb. and where maximum content is over 0.06 per cent to 0.10 per cent, the extra is 25c. a lb.

Prices on ferroalloys for fourth quarter have been reaffirmed by a leading producer.

Current pig iron prices are being extended through the fourth quarter, but usually without formal announcement.

Steel Operations

. . . Production swings upward to rate higher than in pre-holiday week

Steel ingot production this week is a full point above that of the week before Labor Day, being estimated at 92½ per cent. Several districts, including PITTSBURGH, are operating at the same rate as before the holiday, others are slightly below their pre-holiday rate and still others are slightly above. The best gains are in the YOUNGSTOWN and SOUTHERN OHIO districts. YOUNGSTOWN is at 92 per cent compared with 88 per cent two weeks ago; while SOUTHERN OHIO is at 93½ per cent, compared with 84 per cent two weeks ago.

Pig Iron

. . . Sales being made for fourth quarter at unchanged prices

Without making formal price announcements for fourth quarter, producers of merchant pig iron are booking orders for that period at unchanged prices. New buying is not brisk, but shipments are in good volume, as is indicated by the current production figures, which, though largely bolstered by steel making iron, also show a substantial amount of merchant iron output.

Though foundry pig iron has not yet benefitted from the national defense program to the extent that steel has, there is a growing amount of business that will call for castings. The heavy demands being made on the machine tool industry are, of course, an important factor in foundry work, while expanding production of automobiles in the 1941 model programs are also an aid.

Several leading centers, including CHICAGO, CLEVELAND, BUFFALO, and ST. LOUIS, report increasing shipments and a better foundry melt. Notwithstanding the fact that some producers of pig iron stress the possibility of a pig iron shortage when the defense program has got into full swing, melters do not seem to be greatly impressed with this danger and are still ordering iron conservatively, not building inventories to any extent.

The fear of a pig iron shortage some time during the fall or winter is predicted on the probability that the combined influence of national defense orders, railroad equipment orders, automobile production and other uses, may absorb all the iron that is available. Production increases beyond this point may be limited by the amount of ore that can be brought down the Lakes before the close of navigation and the fact that some idle blast furnaces would have to undergo expensive repairs before being put into blast.

Merchant Bars

. . . Incoming tonnage in good volume, expected to increase

Hot rolled bar bookings in PITTSBURGH continue in heavy volume. With no headway being made in reducing mills' unfilled order backlogs, domestic consumers including jobbers have finally realized that deliveries are becoming more extended and in the past few days have increased their bookings considerably. At present, delivery promises range from four to six weeks, with production running at close to capacity. Direct and indirect orders against national defense work are gradually accounting for a larger share of current business.

Hot rolled carbon bars are one of the most active items in the CHICAGO district. Fairly prompt deliveries are available, however, and producers are as anxious for new business as ever. Forgers are exceptionally active, and many have orders of one type or another bearing on the national defense program. Manufacturers of agricultural implements are active consumers once again after slightly reduced operations throughout the summer months. Makers of farm and industrial tractors are continuing without a letup the capacity operations that were seen all summer long. Bars are a quick turnover item for steel warehouses and their stocks are being maintained at a high level. Automotive parts makers in this district are operating at near capacity. According to preliminary estimates, September bar orders should exceed those of August.

Orders and inquiries in CLEVELAND slowed down the past week and with some makers shipments are in excess of incoming business. However, there are indications of an increase in the demand shortly from automobile parts makers.

Reinforcing Bars

. . . Reinforcing steel awards total 16,850 tons, inquiries 8910 tons

Reinforcing steel awards of 16,850 tons include 8700 tons at Hartford, Conn., for the Park River conduit; 2000 tons for naval shore facilities at San Diego, Cal., and 1500 tons for the Clarence Perkins housing project at Baltimore.

Among new reinforcing steel project of 8910 tons is 3000 tons Philadelphia for the Poplar housing project.

Incoming specifications for reinforcing bars continue in heavy volume at mills with shipments this month running slightly ahead of the same period in August. Prices on new business, though occasionally shaded, are holding much firmer than before.

Shipbuilding

. . . Navy places contracts for 200 war vessels . . . will take 498,000 tons of plain steel

• • • **The Navy Department** on Monday awarded contracts to 11 companies and made allocations to government navy yards for starting construction of 200 combatant naval vessels to cost an estimated $3,861,053,312. Plain steel requirements were estimated at 498,000 tons.

The contracts, which were made public by the Navy after President Roosevelt affixed his signature to the House and Senate approved supplemental appropriation bill, went to these companies:

Newport News (Va.) Shipbuilding & Dry Dock Co., four aircraft carriers, two cruisers.

Bethlehem Steel Co., Fore River plant, Quincy, Mass., four aircraft carriers, six cruisers; Union plant, San Francisco, four cruisers, 18 destroyers; San Pedro plant, Los Angeles, Cal., six destroyers; Staten Island, N. Y., 10 destroyers.

New York Shipbuilding Corp., Camden, N. J., 10 cruisers.

Federal Shipbuilding & Dry Dock Co., Kearny, N. J., five cruisers, 17 destroyers.

Consolidated Steel Corp., Ltd., Orange, Tex., 12 destroyers.

Bath (Me.) Iron Works Corp., 11 destroyers.

Electric Boat Co., Groton, Conn., 25 submarines.

Manitowoc (Wis.) Shipbuilding Co., 10 submarines.

Los Angeles (Cal.) Shipbuilding & Dry Dock Co., one repair ship.

Gulf Shipbuilding Corp., Chickasaw, Ala., four destroyers.

Government Navy yards received allocations as follows:

New York, two battleships; Philadelphia, three battleships; Norfolk, two battlesips; Boston, six destroyers; Charleston, five destroyers; Puget Sound, six destroyers; Portsmouth, six submarines; Mare Island, two submarines.

It was explained that the estimate of $3,861,053,312 includes the cost of armor and armament and, in the case of submarines, also includes government-furnished machinery. Without particularizing, the department said that actual execution of certain contracts is subject to final decisions as to the manner, financing and amortizing plant expansion and additional facilities, and subject to the authorization of contracts by the Secretary of the Navy.

The contracts and allocations, covering naval vessels, ordnance material and expansion of facilities necessary under the long-range program, were the subject of tentative agreements negotiated on the basis of proposals submitted by shipbuilding companies so that contracts could be released promptly after passage of the legislation.

As a result of the efforts of William B. Knudsen, head of the production division of the National Defense Advisory Commission, the Navy completed the award of contracts and allocations immediately after the President approved the legislation on Monday.

Passage of the second supplemental defense appropriation act brought to a total of $2,571,095,068 the cash appropriated for the navy for the fiscal year of 1941. In addition, Congress approved Navy contract authorizations of $814,495.612, bringing the total to $3,385,590,680 in cash and contract authorizations.

Under construction at the present time are 17 battleships; 12 aircraft carriers; 48 cruisers; 171 destroyers; and 82 submarines.

Approximately 25,000 tons of steel will be required for two passenger ships of 35,500 tons displacement. The Seattle-Tacoma Shipbuilding Corp., Tacoma, Wash., was the only bidder.

Semi-Finished Steel

. . . Demand is sustained . . . British orders a large factor

In the seven days following the holiday, new business in semi-finished steel at PITTSBURGH was fully up to the better volume in the preceding week, due largely to sustained export demand and a slight gain in domestic bookings. British orders for most types of semi-finished continued heavy, with a pickup noted in demand for small billets. Sales of skelp, slabs and billets are holding up to recent high levels and mills report no reduction in the volume of unfilled tonnage.

Bolts, Nuts and Rivets

. . . Makers to announce fourth quarter prices soon

While orders and shipments in CLEVELAND were lighter during August than in July, a gain is reported this month. Makers have not yet named fourth quarter prices but expect to do so in a few days.

Plates

. . . Deliveries on wide material six weeks or longer

The volume of new plate bookings at PITTSBURGH last week was off slightly owing to the loss of one business day, but the former rate of placements has been resumed again, with demand generally in excess of shipments. Delivery dates on wide plates are running six weeks or more, while the continued expansion in mill backlogs has resulted in more customers placing orders in advance to assure shipment when needed. Active demand continues from ship and freight car builders, while the Navy Department is taking larger tonnages under the national defense expansion program.

With the news from Washington this week that the Manitowoc Shipbuilding Co., Manitowoc, Wis., has received a Navy order for 10 submarines, the potentialities of the Great Lakes region as a manufacturing center for small vessels of all types are brought to the fore. Were large scale orders for submarines, torpedo boats, mine layers and sweepers and other necessary small naval vessels placed in that vicinity, the plate market would receive a substantial impetus. Meantime there is the certainty that many more cars will be ordered by the Western railroads and that the current activity of structural plate fabricators will continue. With the exception of wide plates, delivery on which is being quoted at six to eight weeks by one mill, plates in general may be obtained in two to three weeks.

Miscellaneous demand for plates in CLEVELAND is holding up well. Mill capacity is well booked. Bookings in the NEW YORK area have been on the light side since the holiday and there is little in the picture to suggest a change upward in the immediate future. While backlogs are still fairly substantial, deliveries can be made by most mills in three weeks.

Structural Steel

. . . Structural steel awards 35,500 tons and new projects 30,610 tons

Fabricated structural steel awards advanced to 35,500 tons from 24,810 tons last week. Outstanding lettings are 12,000 tons for a subway in Brooklyn; 4500 tons at Mobile, Ala., for an airplane repair shop for the Southeast Air Depot; 2900 tons at East Hartford, Conn., for the Pratt & Whitney division of the United Aircraft Corp.; 2700 tons for a shop and runway at the Brooklyn Navy Yard; 2500 tons for naval aviation facilities on Oahu Island, Hawaii; 2310 tons for the Glenn L. Martin plant at Middle River, Md.; 1800 tons for the Consolidated Aircraft Corp. plant extension at San Diego, Cal., and 1100 tons for government warehouses at Philadelphia.

New structural steel projects declined to 30,610 tons from 40,200 tons a week ago. The largest new inquiries reported include 14,000 tons for elevated highways on Hamilton and Third Avenues in Brooklyn; 2550 tons for aviation and ordnance facilities in the Canal Zone; 1500 tons for a foundry at Paterson, N. J., for the Wright Aeronautical Corp.; 1300 tons at Dupue, Ill., for a furnace building for the New Jersey Zinc Co.; 1200 tons for barracks at Quonset Point, R. I., for the Navy Department; 1100 tons for a machine shop for

the Mesta Machine Co., Homestead, Pa., and 1000 tons at Vandalia, Ohio, for the Aeroproducts Division of General Motors Corp.

While there was a slight dip in new tonnage during the Labor Day week, incoming specifications on structural steel at Pittsburgh continue in heavy volume with mills unable to keep up to new business. Inquiries and orders for national defense requirements are expanding and with deliveries being more extended fabricators are beginning to cover their forward needs in larger volume.

Great Lakes Shipyards have been asked to bid on 10 seaplane tenders and eight mine sweepers for which the Navy Department will take bids Sept. 18.

Sheets and Strip

. . . Releases from automobile industry are gaining

Fresh orders for sheets and strip at PITTSBURGH are being received in about the same relatively low volume as before. Releases from the automotive trade are gaining and producers believe that most of this low-priced tonnage will be shipped out by the end of the month. New buying by the car makers, however, is not expected in volume for many weeks. Farm implement makers are placing a little more business, although most of the new full priced tonnage comes from miscellaneous buyers.

September sheet demand at CHICAGO is showing a gradual increase over last month as automobile releases become heavier and more and more smaller buyers enter the market. Most of the low priced sheets now on the books will be shipped by the end of this month and carry-over into October is expected to be slight. More and more sheets are being sold at the full market price. Inventories of sheets are fairly large, especially at steel warehouses, but the present and expected rate of consumption is such that these above normal stocks are not expected to cause any lag in production. It appears that the automobile industry will not make another major buy until mid-October or later.

Tubular Goods

. . . Orders are holding at fairly steady level

Fresh business in tubular products last week was in lower volume than before, due to the Labor Day holiday, but on an average daily basis incoming tonnage held about even with the previous week's bookings.

Stanolind Pipe Line Co. has placed an order for 15,000 tons of 12 in. pipe for an 180 mile crude oil pipe line to run from La Plata, Mo., to Woodriver, Ill.

Railroad Buying

. . . Orders placed for 21 diesel-electric locomotives

Chief activity in the railroad market in the past week was in motive power equipment, with 21 diesel-electric locomotives being placed. Freight car purchases for the week were 610 cars.

Largest locomotive buy was that of Milwaukee Road, which ordered 18 diesel-electric switchers, divided as follows: 12 to Electro-Motive Corp., four to American Locomotive Co., and two to Baldwin Locomotive Works. Chicago, St. Paul, Minneapolis & Omaha awarded two diesel-electric locomotives to Electro-Motive Corp. and one to American Locomotive Co.

Canadian Pacific has awarded 100 gondolas, 10 baggage and express cars and 25 passenger car underframes to Canadian Car & Foundry Co., and 100 gondolas and 300 hopper cars to National Steel Car Corp. Canadian Pacific has been awarded a contract to build 300 18-ton tanks for the Canadian Government.

Chicago, Indianapolis & Louisville has placed an additional 100 hopper cars with Pullman Standard Car Mfg. Co.

Orders received by domestic equipment manufacturers in August totalled 65 locomotives, 7645 freight cars and 102 passenger-train cars, according to *Railway Age*.

The Rock Island has ordered 200 50-ton box cars from the American Car & Foundry Co. and 100 70-ton gondolas from Pullman Standard Car Mfg. Co.

Wire Products

. . . Government to buy several thousand tons of nails

Cleveland reports that all signs point to brisk buying this month in connection with the government defense program. Rods in certain sizes are sold out for the remainder of September and one or two old production units long idle are expected to be put in operation again shortly. One steel company has unsuccessfully attempted to buy rods from competitors who under normal conditions have ample supplies. Considerable wire drawing capacity is still unengaged.

Aggregate orders taken by CLEVELAND wire producers in August were fairly close to the peak set in July. Domestic business was better than in July, but foreign demand fell off.

Demand for merchant wire products at PITTSBURGH is starting to pick up slightly in advance of the usual fall buying season, while manufacturers' wire bookings continue to gain slowly.

The United States Army Engineers Office, Washington, will open bids Sept. 12 on 1000 tons of wire nails. The nails are to be used in connection with a general construction program under the "purchase and hire system." The army is expected soon to ask for several thousand tons of nails for the construction of cantonments.

Chicago sales are continuing on about the same level as a week ago. Over the next few weeks demand for merchant wire products should increase seasonally, and at the same time there is the expectation of a further rise in requirements for manufacturing wire.

Tin Plate

. . . Operations only 44% . . . Orders, including export, light

Tin plate business continues very slow. With several mills operating spasmodically, operations this week are estimated at 44 per cent of capacity, up only one point from the Labor Day week. The loss of export business, plus the fact that most consumers have their forward needs well covered, precludes any immediate change in present conditions. Shipments in August were slightly in excess of output with the result that mill stocks were reduced moderately.

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Brisk British Demand

Cincinnati

Defense preparations continue to be reflected in steady volume of machinery orders both from Government and private sources. In addition, British demand continues brisk, and there is a fair volume of general ordering of which automobile retooling is a new feature. One interest reports that changeover of French contracts to Britain is still occupying much attention. Talk of increased plant space, which has been in the minds of management for sometime, became concrete last week, when Cincinnati Bickford Tool Co. applied for a building permit to erect a $140,000 addition to its plant.

Buying Pace Accelerated

New York

• • • **Although the tremendous** new tooling programs of the two big aircraft engine builders have only begun, as far as the buying of machine tools is concerned, and much more extensive buying is expected from these sources, nevertheless buying from other industrial concerns with government contracts was in such volume as to set new highs for last week's total sales. Some dealers booked as much business in dollar volume last week as has been done in some of the best months this year and as much as two months' business or more in a normal market. Such companies as American Locomotive Co., which recently received a government contract for gun mounts, and General Electric Co. were represented in the buying. Navy yards both here and in the New England area also bought machine tools in large quantities, as did some of the arsenals. Some of the recent government contracts placed in the East have been given preference classifications A-1 and A-2 by the Army and Navy Munitions Board, but as far as quoted machine tool deliveries are concerned, the aircraft manufacturers and the machine tool builders themselves still take precedence over all others.

It is obvious that the government has only started to place defense contracts and the big bulk of the awards is yet to come. Very little munitions business has been placed thus far. However, equipment for this type of manufacture is probably more quickly available than other type of machine tools. A number of 37 mm. shell jobs are being figured on right now. On other types of machine tools, however, dealers are frankly puzzled as to just where the machines will come from to supply national defense demand, since backlogs are mounting so rapidly.

Large Purchases Pending

Cleveland

New orders for machine tools, which were exceptionally heavy in August, continue to be received in great volume by producers here. Several attractive projects are being talked about in this immediate vicinity, one involving upward of $1,000,000 in new equipment. Several large propositions are in the air at Detroit, where automotive concerns apparently are considering embarking upon essential defense ventures. Quotations have been submitted to one auto maker for considerable new equipment which may be intended for the manufacture of airplane engines.

The armament program appears heading into a situation where in six or eight weeks a great mass of orders will be dumped into the laps of machine tool producers. Orders cannot legally be placed at the present time, because the huge appropriation bill hasn't been passed. Both the Army and Navy are doing their level best to smooth out the flow of machine tool orders. Programs which would spread the load on the machine tool industry over a period of months are believed to have been mapped out, but the difficulty comes in controlling contractors who desire deliveries overnight upon receiving government awards. It is the consensus of machine tool producers here that one of the most helpful moves at the present time would be for contractors to coincide delivery of machine tools more closely with their actual production needs.

Armament Orders Increase

Chicago

Week by week, more and more of the orders being placed at Chicago for machine tools are for armament production. It is felt, however, that the bulk of the business is still general industrial demand. In spite of the rush of orders from all industries, and the gradual extension of backlogs, many machine tool builders are still reluctant to expand their plants until more is known of the administration's plans regarding amortization and excess profits. Chicago district ordnance officers stated recently that their own purchases plus those of the Rock Island arsenal and other Army and Navy purchasing departments should approximate $200,000,000 in the Chicago district alone within 12 months.

Reich Victories Reduce Its Labor Shortage

Washington

• • • **Citing the German** occupation of the Lorraine district's iron mines and the coal mines of northern France as instances of German gains, the Commerce Department said last week in the first authoritative picture of German-occupied countries of Europe that the Reich's victories during the past 12 months have helped rather than impaired Germany's economic position.

"Germany now controls or has exclusive access to all important coal and iron deposits on the continent with the exception of the Soviet Union," reported Louis Domeratzky, chief of the department's division of regional information.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, Sept. 10—A heavy buying movement, which affected most of the non-ferrous metals except tin, set in toward the end of the past week, sending sales figures for the period to new recent highs. Simultaneously with the renewal of consumer interest, zinc and copper prices were revised upward. The increase in copper, amounting to ½c. per lb., was accompanied by a secondary burst of activity as consumers endeavored to take advantage of the usual grace period. This spurt reached a peak when 113,106 tons were sold on Thursday. The buying at the height of the wave was chiefly for December, although there was substantial call for November shipment. Nearby dates were practically ignored.

Zinc

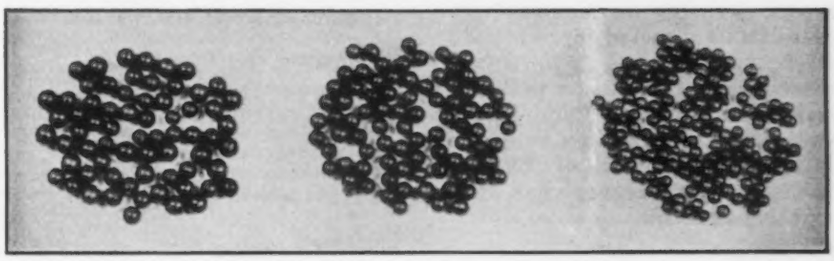
Heavy sales and a price increase of $7 a ton were features of the spelter market last week. The rise in prices, which generally had been anticipated in view of the tight supply situation, established quotations at 7.24c. per lb., New York. For some time buyers have been unable to obtain any important quantity at a fixed price, without having to take similar amounts of on an average price basis. Prime western sales in the past week were 18,460 tons as compared with 11,500 tons in the preceding week. Shipments for the period amounted to 7040 tons. A further decrease in stocks was shown in August, the total at the end of the month, 44,065 tons, being close to 20,000 tons below the month's shipments of 64,065 tons. The August stock position is 14,126 tons below the July figure, while the shipment total represents a gain of over 6000 tons over July.

A strong demand throughout the past week, caused partly by the new bullishness in copper and zinc, resulted in piling up one of the largest weekly sales totals in some time. The usual first-of-the-month average price business was also instrumental in building up the week's total. September needs now stand about 90 per cent covered, while October requirements are about 60 per cent bought. Prices remain unchanged at 4.90c. per lb., New York.

Tin

An easing of prices to within the government buying limit of 50c. per lb. for futures, resulted in a modest amount of buying for the government's strategic metals stock pile in the past week. Consumers, however, showed little interest, being content with limiting their activities to replacing metal being currently consumed in order to maintain the heavy inventories built up in anticipation of possible cessation of shipments from the Far East. Straits tin today was quoted at 50.05c. per lb., New York, as compared with 50.50c. a week ago.

Average prices of major nonferrous metals in August, based on quotations appearing in THE IRON AGE were as follows: Electrolytic copper, Connecticut Valley (mine producers only), 11.09c. Lake copper, eastern delivery, 11.09c.; Straits tin, spot, New York, 51.21c. Zinc, East St. Louis, 6.40c., and lead, St. Louis, 4.85c.



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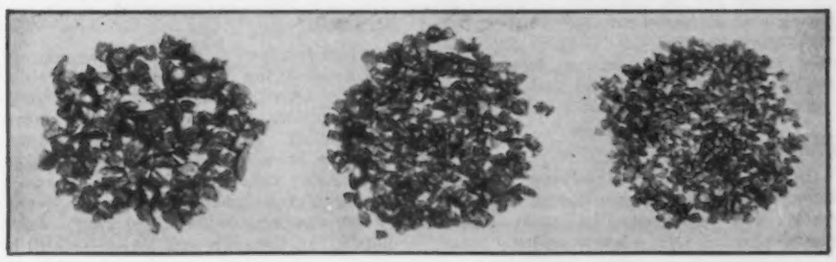


Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **With increased strength** shown in practically all districts, THE IRON AGE composite this week rose 63c. to $19.92, equaling the previous high of the present year established in the third week of June. It required four weeks to bring the composite down to $18.17, the low point of the recent dip where it remained for three weeks, and exactly four weeks were needed to raise quotations to their previous high. The heaviest contributor to the week's increase in the composite was Pittsburgh where the average advanced $1.25. Philadelphia gained 25c. and Chicago rose 37.5c. New strength was especially evident in the Pittsburgh and the Chicago markets. In the former, No. 1 steel gained $1.25 in the week, while at Chicago, increases ranging from 25c. to $1.25 occurred. Request of the National Advisory Defense Commission for revisions in the scrap export licensing arrangement appears to be directed more toward extending the licensing to include other grades in addition to No. 1, rather than toward establishing a total embargo. Lacking complete details, the reaction of Eastern markets to this request has been negative thus far.

Pittsburgh

The market here has turned much stronger in the past week and, based on sales into consumption and higher broker offerings, No. 1 heavy melting has advanced to $20 to $20.50, up an average of $1.25 from a week ago. Other grades are also stronger with railroad heavy melting and specialties from recent lists bringing higher prices. Movement of scrap from Pittsburgh to Youngstown has lessened in past few days.

Chicago

On the basis of a mill sale at $19.25 a gross ton, delivered, heavy melting steel at Chicago has been raised 50c. to a range of $18.75 to $19.25. Other grades throughout the list continue exceptionally strong and advances ranging from 25c. to $1.50 have been made. Brokers are unable to buy heavy melting steel from dealers for less than $18.75 and in some cases $19 has been paid.

Philadelphia

On the basis of mill buying, further strength was shown here during the past week, and quotations on most items moved upward. No. 1 heavy melting steel is quoted at a flat $20.50, and No. 2 at $19.50. Cast iron carwheels and mixed yard cast are up 50c., while specialties and iron and steel pipe have advanced $1.

Youngstown

The market is firm at the recent advances. No new consumer purchasing was reported during the week. Railroad scrap offered a few days ago brought $21.25 for heavy melting, $26 for specialties and $21 for cast carwheels or from $1.50 to $2 more than a month ago.

Cleveland

The market is very firm and open hearth grades have advanced another 50c. a ton, No. 1 heavy melting now ranging from $19.50 to $20. A local consumer has paid as high as $20. Buying subsided the past week but dealers are busy covering against recent orders.

Buffalo

The market here continues strong with no changes in prices. Inquiries are numerous but no new sales have been reported in the last week. Scrap exports to Canada are still substantial. Release is expected momentarily from a large consumer that has been holding up some shipments for nearly a month.

Birmingham

The market here continues to show increasing strength with No. 1 and No. 2 heavy melting advancing 50c. Scrap at dealers' yards is reported very low but the advance is expected to bring out tonnages which have been withheld.

Cincinnati

The market here is experiencing better consumer demand, with dealers reporting interest in both mill and foundry grades. Yard prices, however, are not changed since mills tend to resist higher material costs.

Detroit

Bullishness in surrounding territory, sufficient to move scrap out of Detroit in volume and to lead some brokers to lay down scrap on the docks, is responsible for an upward movement of scrap prices in this area amounting to 25c. or 50c. a ton. Automotive lists closed strong and some scrap bought speculatively was sold and moved almost immediately after the lists had closed.

St. Louis

Prices continue to advance here, mainly due to covering by brokers and dealers who are short. Offerings during the past week continued light, particularly from the country. In the past week, railroad offerings have increased lists before the trade about 45,000 tons. Included is 24,453 tons by Texas and Pacific, first list issued by this company in about five years. Purchasing by the mills and foundries still is in moderate volume, but is expected to increase substantially in the next few weeks.

New York

After several weeks of unchanged levels, domestic prices here have moved up 50c., influenced largely by the recent advances in eastern Pennsylvania quotations. Export buying prices, however, are unchanged. Bulk of activity lately has been in No. 2 steel. For domestic account, most dealers are paying $15 for No. 2, although both $14.50 and $15.50 have been paid lately. Most of No. 2 bought for export has been at $14.50. Threat of further licensing restrictions on exports has had little effect on the market thus far. Most interests have considered this step as inevitable and have largely discounted its possible effects. Export loadings for both England and Japan are currently at a rate substantially below the July and August levels. A. A. Volk, New York, was low bidder on demolition contract on Ninth Avenue elevated, involving about 63,000 tons of structural scrap. Contract stipulates that material cannot be sold for export.

Boston

Buying for eastern Pennsylvania and Massachusetts delivery has stiffened prices. Pittsburgh district consumers are not real factors in the market today. American Steel & Wire Co. is paying $17 for No. 1 steel delivered, and $15 for No. 2. Yards are offered $14.25, f.o.b., for No. 2 steel for Massachusetts delivery, within 50c. to $1 of prices paid by exporters at dock. Textile machinery makers pay as high as $20, truck delivery, for textile cast. For eastern Pennsylvania delivery, $12 to $12.25, f.o.b., has been paid for bundled skeleton, $15.25 for breakable cast, and $9.25 for steel turnings. Demand for stove plate is better and prices are about $1 higher.

Toronto

Firmer prices developed in the Canadian scrap markets during the week, and dealers advanced buying prices on low phosphorous steel and stove plate 50c. No. 2 heavy melting was reduced 25c. to $9.75, Toronto. Other items were unchanged. Demand is brisk, with consumers taking all offerings. One dealer has brought down 5000 tons from northern Ontario, as supplies in immediate Toronto area are starting to dry up. However, there is no scarcity of scrap, other than stove plate and No. 1 cast. One Ontario melter is reported to have brought in a large tonnage of stove plate from Buffalo.

Pacific Coast

Exports from Pacific Coast ports are still in substantial quantities, including licensed shipments to Japan. Bulk of exports consist of No. 2 steel, which some sources state is being sweetened to some extent with No. 1 material, although shipments are still classified as No. 2 steel.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $20.50
Railroad heavy mltng.	21.50 to 22.00
No. 2 heavy melting	18.50 to 19.00
Railroad scrap rails	22.50 to 23.00
Rails 3 ft. and under	24.50 to 25.00
Comp. sheet steel	20.00 to 20.50
Hand bundled sheets	19.00 to 19.50
Heavy steel axle turn.	19.00 to 19.50
Machine shop turnings	15.00 to 15.50
Short shov. turnings	16.00 to 16.50
Mixed bor. & turn.	12.50 to 13.50
Cast iron borings	12.50 to 13.50
Cast iron carwheels	21.00 to 21.50
Heavy breakable cast.	17.00 to 17.50
No. 1 cupola cast	20.00 to 20.50
RR. knuckles & coup.	26.00 to 26.50
Rail coil springs	26.00 to 26.50
Rail leaf springs	26.00 to 26.50
Rolled steel wheels	26.00 to 26.50
Low phos. billet crops	26.00 to 26.50
Low phos. punchings	25.00 to 26.00
Low phos. heavy plate	24.50 to 25.00
Railroad malleable	24.00 to 24.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.50
No. 2 hvy. mltng. steel	19.50
Hydraulic bund., new	20.50
Hydraulic bund., old	$17.50 to 18.00
Steel rails for rolling	22.50 to 23.00
Cast iron carwheels	22.00 to 22.50
Hvy. breakable cast	21.00
No. 1 cupola cast	22.00 to 22.50
Mixed yard (f'd'y) cast	19.00 to 19.50
Stove plate (steel wks.)	17.50 to 18.00
Railroad malleable	22.50 to 23.00
Machine shop turn.	14.50 to 15.00
No. 1 blast furnace	13.00 to 13.50
Cast borings	13.00 to 13.50
Heavy axle turnings	19.00 to 19.50
No. 1 low phos. hvy.	25.00 to 25.50
Coupl rs & knuckles	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Steel axles	23.50 to 24.00
Shafting	25.00 to 25.50
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$18.75 to $19.25
Auto. hvy. mltng. steel alloy free	17.75 to 18.25
No. 2 auto steel	15.75 to 16.25
Shoveling steel	18.75 to 19.25
Factory bundles	18.25 to 18.75
Dealers' bundles	16.75 to 17.25
No. 1 busheling	17.75 to 18.25
No. 2 busheling, old	11.50 to 12.00
Rolled carwheels	22.50 to 23.00
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs	22.50 to 23.00
Steel coup. & knuckles	22.00 to 22.50
Axle turnings	18.00 to 18.50
Coil springs	23.50 to 24.00
Axle turn. (elec.)	19.75 to 20.00
Low phos. punchings	22.50 to 23.00
Low phos. plates 12 in. and under	22.00 to 22.50
Cast iron borings	12.75 to 13.25
Short shov. turn.	13.50 to 14.00
Machine shop turn.	12.75 to 13.25
Rerolling rails	22.50 to 23.00
Steel rails under 3 ft.	22.00 to 22.50
Steel rails under 2 ft.	22.50 to 23.00
Angle bars st el	21.50 to 22.00
Cast iron carwheels	19.50 to 20.00
Railroad malleable	22.50 to 23.00
Agric. malleable	17.25 to 17.75

	Per Net Ton
Iron car axles	24.50 to 25.00
Steel car axles	23.00 to 23.50
Locomotive tires	17.50 to 18.00
Pipes and flues	13.50 to 14.00
No. 1 machinery cast	17.00 to 17.50
Clean auto. blocks	17.50 to 18.00
No. 1 railroad cast	16.50 to 17.00
No. 1 agric. cast	16.00 to 16.50
Stove plate	12.50 to 13.00
Grate bars	13.50 to 14.00
Brake shoes	14.50 to 15.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $20.50
No. 2 hvy. mltng. steel	19.00 to 19.50
Low phos. plate	23.00 to 23.50
No. 1 busheling	19.25 to 19.75
Hydraulic bundles	19.50 to 20.00
Machine shop turn.	14.00 to 14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	18.50 to 19.00
Comb. sheet steel	$19.00 to $19.50
Light bund. stampings	15.50 to 16.00
Drop forge flashings	18.50 to 19.00
Machine shop turn.	12.50 to 13.00
Short shov. turn.	13.00 to 13.50
No. 1 busheling	18.75 to 19.25
Steel axle turnings	18.00 to 18.50
Low phos. billet and bloom crops	24.00 to 24.50
Cast iron borings	13.00 to 13.50
Mixed bor. & turn.	13.00 to 13.50
No. 2 busheling	13.00 to 13.50
No. 1 cupola cast	22.00 to 22.50
Railroad grate bars	15.00 to 15.50
Stove plate	15.00 to 15.50
Rails under 3 ft.	25.00 to 25.50
Rails for rolling	24.00 to 24.50
Railroad malleable	23.00 to 23.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$19.50 to $20.00
No. 2 hvy. mltng. steel	17.50 to 18.00
Scrap rails	21.50 to 22.00
New hvy. b'ndled sheets	17.50 to 18.00
Old hydraul. bundles	16.00 to 16.50
Drop forge flashings	17.50 to 18.00
No. 1 busheling	17.50 to 18.00
Machine shop turn.	12.50 to 13.00
Shov. turnings	14.00 to 14.50
Mixed bor. & turn.	12.50 to 13.00
Cast iron borings	12.50 to 13.00
Knuckles & couplers	23.50 to 24.00
Coil & leaf springs	23.50 to 24.00
Rolled steel wheels	23.50 to 24.00
No. 1 machinery cast.	19.50 to 20.00
No. 1 cupola cast	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	24.50 to 25.00
Cast iron carwheels	18.00 to 19.00
Railroad malleable	22.00 to 23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$16.75 to $17.25
No. 1 hvy. melting	15.00 to 15.50
No. 2 hvy. melting	14.75 to 15.25
No. 1 locomotive tires	17.00 to 17.50
Misc. stand. sec. rails	18.75 to 19.25
Railroad springs	20.00 to 20.50
Bundled sheets	11.50 to 12.00
Cast bor. & turn.	9.00 to 9.50
Machine shop turn.	9.50 to 10.00
Heavy turnings	13.00 to 13.50
Rails for rerolling	21.00 to 21.50
Steel car axles	22.00 to 22.50
No. 1 RR wrought	13.00 to 13.50
No. 2 RR wrought	15.50 to 16.00
Steel rails under 3 ft.	21.25 to 21.75
Steel angle bars	18.00 to 18.50
Cast iron carwheels	18.25 to 18.75
No. 1 machinery cast.	19.00 to 19.50
Railroad malleable	19.00 to 19.50
Breakable cast	16.50 to 17.00
Stove plate	12.50 to 13.00
Grate bars	13.00 to 13.50
Brake shoes	14.00 to 14.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$15.75 to $16.25
No. 2 hvy. mltng. steel	14.25 to 14.75
Scrap rails for mltng.	21.25 to 21.75
Loose sheet clippings	11.25 to 11.75
Hyd'lic bundled sheets	15.00 to 15.50
Cast iron borings	7.25 to 7.75
Machine shop turn.	8.25 to 8.75
No. 1 busheling	11.75 to 12.25
No. 2 busheling	6.00 to 6.50
Rails for rolling	22.75 to 23.25
No. 1 locomotive tires	18.00 to 18.50
Short rails	23.25 to 23.75
Cast iron carwheels	17.25 to 17.75
No. 1 machinery cast	19.75 to 20.25
No. 1 railroad cast	18.25 to 18.75
Burnt cast	11.75 to 12.25
Stove plate	11.75 to 12.25
Agricul. malleable	16.25 to 16.75
Railroad malleable	19.25 to 19.75
Mixed hvy. cast	17.00 to 17.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$16.50
No. 2 hvy. melting steel	15.50
No. 1 busheling	14.50
Scrap steel rails	16.00
Steel rails under 3 ft.	18.00
Rails for rolling	18.00
Long turnings	5.00
Cast iron borings	8.50
Stove plate	11.00
Steel axles	16.50
No. 1 RR wrought	12.00
No. 1 cast	16.50
No. 2 cast	12.50
Cast iron carwheels	15.00
Steel carwheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	$15.50 to $16.00
No. 2 heavy melting	14.50 to 15.00
Borings and turnings	11.00 to 11.50
Long turnings	9.75 to 10.25
Short shov. turnings	11.00 to 11.50
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	11.75 to 12.25
Hydraul. Comp. sheets	17.50 to 18.00
New busheling	16.25 to 16.75
Sheet clips	14.50 to 15.00
Flashings	15.50 to 16.00
Low phos. plate	19.00 to 19.50

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel	14.50 to 15.50
Hvy. breakable cast	16.50 to 17.00
No. 1 machinery cast	18.00 to 18.50
No. 2 cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Steel car axles	20.00 to 21.00
Shafting	20.00 to 20.50
No. 1 RR. wrought	14.50 to 15.50
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	16.50 to 17.50
Clean steel turnings*	9.50 to 10.00
Cast borings*	8.50 to 9.00
No. 1 blast furnace	8.50 to 9.00
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50

Per gross ton delivered local foundries:

No. 1 machin. cast	$18.00 to $19.00
No. 2 cast	16.00 to 16.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	$15.00 to $15.25
Machine shop turn.	8.50 to 9.25
Mixed bor. & turn.	7.00 to 7.25
Bun. skeleton long	11.75 to 12.25
Shafting	19.25 to 19.50
Stove plate	12.25 to 12.50
Cast bor. chemical	9.00 to 9.50

Per gross ton delivered consumers' yards:

Textile cast	$17.00 to $20.00
No. 1 machine cast	17.00 to 20.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	$15.00 to $15.50
No. 2 steel	14.00 to 14.25

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.		Los Ang.	Seattle
No. 1 hvy. mltng. steel	$13.50	to		$14.00
No. 2 hvy. mltng. steel			$13.00	
Bundles			12.00	

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$12.00	$11.50
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	15.00	14.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	$15.50 to $16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
No. 2 cast	15.00 to 15.50
Stove plate	12.50 to 13.00

Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel	$16.25 to $16.50
No. 2 hvy. mltng. steel	14.75 to 15.00
Rail (scrap)	16.25 to 16.75

Philadelphia, delivered alongside boats, Port Richmond	
No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

Construction Steel

. . .STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings advance to 35,500 tons from 24,810 tons last week; new projects of 30,610 tons against 40,200 tons a week ago; plate awards call for 1065 tons.

NORTH ATLANTIC STATES

12,000 Tons, Brooklyn, subway, to American Bridge Co., Pittsburgh.

2900 Tons, East Hartford, Conn., plant addition, United Aircraft Corp., Pratt & Whitney division, to R. C. Mahon Co., Detroit.

2700 Tons, Brooklyn, shops and runways for Navy Department, to American Bridge Co., Pittsburgh.

2310 Tons, Middle River, Md., factory building extension for Glenn L. Martin Co., to Fort Pitt Bridge Works Co., Pittsburgh.

1100 Tons, Philadelphia, warehouses M-20 and M-26 for Government, to Belmont Iron Works, Philadelphia.

700 Tons, Schaghticoke, N. Y., State bridge FA-SH-40-2, to American Bridge Co., Pittsburgh.

700 Tons, Cheektowaga, N. Y., plant addition for Spencer Lens Co., to R. S. McMannus Steel Construction Co., Buffalo.

520 Tons, Clinton County, N. Y., State highway bridge, to American Bridge Co., Pittsburgh.

500 Tons, Greens Farms, Westport, East Norwalk and Fairfield, Conn., bridges for New York, New Haven & Hartford Railroad, to American Bridge Co., Pittsburgh.

500 Tons, Endicott, N. Y., building for International Business Machines Corp., to American Bridge Co., Pittsburgh.

350 Tons, Quonset Point, R. I., paint and oil storehouse, for Navy Department, to Ingalls Iron Works Co., Birmingham.

350 Tons, Philadelphia, Federal Reserve Bank addition, to Bethlehem Steel Co., Bethlehem, Pa.

300 Tons, New York, contract No. 32, Marginal Street improvement, to American Bridge Co., Pittsburgh.

180 Tons, Lancaster, Pa., roll storage for Armstrong Cork Co., to A. B. Rote & Co., Lancaster.

170 Tons, Governors Island, N. Y., ferry bridge and gallows frame for Government, to an unnamed bidder.

150 Tons, Victor, N. Y., bus garage and central school, to Genesee Bridge Co., Rochester, N. Y.

120 Tons, Westmoreland County, Pa., bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

105 Tons, New York, Carmelite Monastery, 171st Street, to Schacht Steel Construction Co., New York.

THE SOUTH

4500 Tons, Mobile, Ala., airplane repair shop for Southeast Air Depot, to Ingalls Iron Works Co., Birmingham.

218 Tons, San Marcos, Tex., State highway bridge, to the Virginia Bridge Co., Richmond.

175 Tons, Calhoun-Cleveland Counties, Ark., bridge, to Fort Smith Structural Steel Co., Fort Smith, Ark.

CENTRAL STATES

325 Tons, Indianapolis, additions for Marmon-Herrington Co., to H. K. Ferguson Co., Cleveland.

290 Tons, Chicago, addition for Goodman Mfg. Co., to American Bridge Co., Pittsburgh.

275 Tons, Belvidere, Ill., building for the Keene-Belvidere Canning Co., to Bethlehem Steel Co., Bethlehem, Pa.

260 Tons, Chicago, warehouse, Sprague-Warner Co., to Wendnagel & Co., Chicago.

215 Tons, Chicago, power plant addition, United States Tobacco Co., to Eggers Iron Works, Chicago.

205 Tons, Lafayette, Ind., building addition, to Hetherington & Berner, Inc., Cleveland.

165 Tons, Sears, Mich., State bridge B-1 of 67-16-3, to Elkhart Bridge & Iron Co., Elkhart, Ind.

155 Tons, Franklin, Ind., bridge, to Central States Bridge & Structural Co., Indianapolis.

140 Tons, Lebanon, Ind., bridge, to Midland Structural Steel Co., Cicero, Ill.

120 Tons, Xenia, Ohio, Green County bridge, to an unnamed fabricator.

110 Tons, Crookston, Neb., viaduct FLHP-S (1) for State of South Dakota, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

1800 Tons, San Diego, Calif., Consolidated Aircraft Corp. plant addition; 1200 tons to Consolidated Steel Corp., Los Angeles, 600 tons to National Iron Works, San Diego.

200 Tons, Santa Monica, Calif., Douglas Aircraft Co., raw stock and crating building and tooling and personnel building, to Bethlehem Steel Co., Los Angeles.

175 Tons, Portland, Ore., transmission towers, Bradford Island crossing of Columbia River, to Bethlehem Steel Co., through Fritz Ziebarth, Long Beach, Calif., contractor.

HAWAII

2500 Tons, Oahu Island, T. H., Naval aviation facilities, to Columbia Steel Co., San Francisco, through Hawaiian Dredging Co., Raymond Concrete Pile Co., and Turner Construction Co., Alameda, Calif., joint contractors.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

8000 Tons, Brooklyn, contract B-18, elevated highway, Hamilton Avenue, for Triborough Bridge Authority.

7500 Tons, St. George, Del., highway bridge, Phoenix Bridge Co., Phoenixville, Pa., low bidder.

6000 Tons, Brooklyn, contract B-20, Third Ave. elevated highway, for Triborough Bridge Authority.

1500 Tons, Paterson, N. J., foundry for Wright Aeronautical Corp.

1200 Tons, Quonset Point, R. I., barracks, Nos. 1 to 14, for Navy Department.

1100 Tons, Homestead, Pa., Mesta Machine Co. machine shop extension.

675 Tons, Aberdeen Proving Ground, Md., Government buildings.

325 Tons, Westfield, N. Y., State highway bridge; John Schultz Construction Co., Buffalo, low bidder.

265 Tons, Springfield, Conn., building addition for Stamford Rolling Mills Co.

250 Tons, Hillsgrove, R. I., State hangars.

200 Tons, Weston, Mass., water system shaft.

200 Tons, Lynn, Mass., garage for General Electric Co.

150 Tons, Northumberland County, Pa., State highway bridge; bids Sept. 13.

150 Tons, Harrisburg, Pa., building addition for Y.M.C.A.

140 Tons, Hamburg, N. Y., highway bridge; Whitmore Co., Lockwood, N. Y., low bidder.

115 Tons, Lehigh County, Pa., state highway bridge.

100 Tons, Ontario County, N. Y., highway bridge; Smith Engineering & Construction Co., Syracuse, N. Y., low bidder.

Unstated tonnage, Niagara Falls, N. Y., $400,000 chlorite plant for Mathieson Alkali Works.

CENTRAL STATES

1300 Tons, Dupue, Ill., furnace building for New Jersey Zinc Co.

1000 Tons, Vandalia, Ohio, office and factory buildings for Aeroproducts division, General Motors Corp.

850 Tons, Chicago, building for the Goss Printing Press Co.

600 Tons, Flint Mich., service building addition for Chevrolet Motor Co.

500 Tons, Cleveland, addition for Cleveland Pneumatic Tool Co.; bids taken.

450 Tons, St. Louis, warehouse for Sears Roebuck & Co. Bids Sept. 17.

388 Tons, Trumbull County, Ohio, State highway bridge.

300 Tons, Chicago, additional shop building, Northwest Station, Commonwealth Edison Co.; bids Sept. 19.

275 Tons, Dayton, Ohio, building for Patterson Air Field; bids Sept. 20.

THE SOUTH

600 Tons, Radford, Va., power house for Hercules Powder Co.

300 Tons, Weston, W. Va., psychiatric unit, State Hospital.

240 Tons, Nelson-Larue Counties, Ky., State Salt River bridge.

WESTERN STATES

950 Tons, Terminous, Cal., Mokelumne River bridge; bids Oct. 2.

300 Tons, Denver, hangar.

CANAL ZONE

2550 Tons, various locations, aviation and ordnance facilities (Invitation CQM-6708-40-117); Fred J. Early, San Francisco, contractor.

Weekly Bookings of Construction Steel

Week Ended ——→	Sept. 10, 1940	Sept. 3, 1940	Aug. 13, 1940	Sept. 12, 1939	Year to Date 1940	Year to Date 1939
Fabricated structural steel awards	35,500	24,810	21,400	19,100	678,335	670,375
Fabricated plate awards	1,065	450	4,600	3,145	111,315	115,420
Steel sheet piling awards	2,285	175	390	18,600	33,400	66,680
Reinforcing bar awards	16,850	7,150	11,750	4,300	335,615	326,920
Total Letting of Construction Steel	55,700	32,585	38,140	45,145	1,158,665	1,179,395

FABRICATED PLATES

AWARDS

935 Tons, Leetsdale, Pa., barges for River Terminals Corp., to Dravo Contracting Co., Pittsburgh.

130 Tons, Azusa, Cal., Morris Reservoir connection for Metropolitan Water District, to Western Pipe & Steel Co., Los Angeles, through C. M. Elliott and Stroud-Seabrook, Los Angeles, contractors.

Unstated tonnage, Fort Custer, Mich., two 250,000-gal. tanks for War Department, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Unstated tonnage, Chanute Field, Ill., 200,000-gal. water tank, to Chicago Bridge & Iron Co., Chicago.

PENDING PROJECTS

1225 Tons, Bellingham, Wash., 48 and 36-in. water pipe; bids in.

SHEET PILING

AWARDS

1700 Tons, Chicago, Loomis Street dock, Commonwealth Edison Co., divided equally between Bethlehem Steel Co., Bethlehem, Pa., and Carnegie-Illinois Steel Corp., Chicago, through Great Lakes Dredge & Dock Co., Chicago.

335 Tons, Portland, Ore., United States Engineer (Invitation 698-41-62), to Columbia Steel Co., Portland, Ore.

250 Tons, Chicago, docks for General Chemical Co., to Inland Steel Co., Chicago through Great Lakes Dredge & Dock Co., Chicago.

Reinforcing Steel

Awards of 16,850 tons; 8,910 tons in new projects

AWARDS

ATLANTIC STATES

8700 Tons, Hartford, Conn., Park River conduit, to Bethlehem Steel Co., Bethlehem, Pa., through B. Perini & Sons, Inc., Framingham, Mass., contractor.

1500 Tons, Baltimore, Clarence Perkins housing project, to Bethlehem Steel Co., Bethlehem, Pa., through Consolidated Engineering Co., contractor.

300 Tons, Philadelphia, warehouses for Quartermaster's Depot, divided equally between Truscon Steel Co., Youngstown, and Taylor-Davis Co., Philadelphia, through Wark Co.

260 Tons, Philadelphia, Navy Yard buildings, to Bethlehem Steel Co., Bethlehem, Pa., through Hughes-Foulkrod Co.

240 Tons, New Rochelle, N. Y., New Haven Railroad bridge, to Concrete Steel Co., Boston.

130 Tons, Little Compton, R. I., Army reservation improvements, to Truscon Steel Co., Boston.

115 Tons, Easton, Pa., building for Dixie Drinking Cup Co., to Bethlehem Steel Co., Bethlehem, Pa., through Lauter Construction Co.

100 Tons, Cheektowaga, N. Y., plant addition for Spencer Lens Co., to an unnamed bidder.

SOUTH AND CENTRAL

465 Tons, Chicago, subway station section S9B, to Olney J. Dean Steel Co., Chicago, through Kenny Construction Co., Chicago.

400 Tons, Chicago, Sprague-Warner Co. warehouse, to Concrete Steel Co., New York.

320 Tons, Chicago, miscellaneous projects for Sanitary District, to Joseph T. Ryerson & Son, Inc., Chicago.

300 Tons, Hutchinson, Kan., grain elevator, to Sheffield Steel Corp., Kansas City.

254 Tons, Chicago, intake crib and tunnel, Fisk station, Commonwealth Edison Co., to Joseph T. Ryerson & Son, Inc., Chicago.

225 Tons, Portsmouth, Va., Dale home housing project, to Truscon Steel Co., Youngstown, through William Muirhead Construction Co.

210 Tons, Chicago, subway station section S10C, to Concrete Steel Co., New York, through Robert Anderson Co., Chicago.

210 Tons, Chicago, warehouse, Dixie Vartex Co., to Inland Steel Co., Chicago.

200 Tons, Milwaukee, grain elevator, Kurth Malting Co., to Calumet Steel Co., Chicago.

188 Tons, Columbus, Ind., Tabernacle Christian Church, to Truscon Steel Co., Youngstown, through Charles Mermuth & Son.

175 Tons, Lowndes County, Ga., highway work to Truscon Steel Co., Youngstown.

150 Tons, Cleveland, building for Columbia Chemical Co., to Truscon Steel Co., Youngstown.

125 Tons, Wausau, Wis., Employers Mutual Insurance Co. building, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

2000 Tons, San Diego, Cal., Naval shore facilities, to Soule Steel Co., Los Angeles, through M. H. Golden and Walter Trepte, San Diego, contractors.

170 Tons, Fresno, Cal., Roosevelt School, to Kyle & Co., Fresno, through Midstate Construction Co., Fresno, contractor.

105 Tons, Fort Baker, Cal., United States Engineer (Invitation 868-41-23), to Truscon Steel Co., San Francisco.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

3000 Tons, Philadelphia, Poplar housing project; bids Sept. 17.

1200 Tons, Hartford-East Hartford, Conn., State bridge.

1200 Tons, Bowery Bay, N. Y., sewage plant, contract No. 9; bids in.

149 Tons, Providence, R. I., U. S. Engineer, Invitation 699-41-21; bids in.

SOUTH AND CENTRAL

480 Tons, Savannah, Ill., Ordnance Depot buildings; Hagerstrom Construction Co., contractor.

375 Tons, Newport News, Va., Harbor Homes housing project; bids taken.

320 Tons, Cleveland, Cedarmount Co. apartments; bids taken.

260 Tons, Lacrosse, Wis., Bitterbro College.

170 Tons, Columbus, Mount Calvary housing project; H. M. Boyajohn, Columbus, general contractor.

150 Tons, Huntington, W. Va., West End pumping stations; bids in.

133 Tons, Adams County, Ohio, wire mesh for State highway work.

WESTERN STATES

194 Tons, Redwood City, Cal., highway work; bids Sept. 25.

144 Tons, Terminous, Cal., Mokelumne River bridge; bids Oct. 2.

124 Tons, Long Beach, Cal., San Gabriel River bridge; bids Sept. 26.

Cast Iron Pipe

Camanche, Iowa, closes bids Oct. 1 for pipe lines for water system and other waterworks installation, including elevated steel tank and tower, motor-driven turbine pumping unit for deep-well service and accessory equipment. Cullen & Bartels, Lincoln Building, Dubuque, Iowa, are consulting engineers.

Harris County Fresh Water District No. 6, Channelview, Tex., plans pipe lines for water system in Channelview and Lakeside Park areas. Bond issue of $40,000 has been authorized for work.

Columbus, Ohio, plans pipe line extensions and replacements in water system and other waterworks improvements. Cost close to $400,000. Bids are scheduled to be asked soon. P. W. Maetzel is city engineer.

Water Department, Vancouver, Wash., Rex Osborne, superintendent, plans about 39,690 ft. of 8, 6 and 4-in. pipe for extensions in water system in Minnehaha district; also new 50,000-gal. elevated steel tank and tower, pumping station and other waterworks installation. Cost about $75,000. Bids will be asked for pipe and other equipment early in October. J. L. Henderson is city engineer.

Holyoke, Colo., plans pipe line extensions and replacements in water system, and other waterworks installation. Bond issue of $65,000 is being arranged for work.

Delaware Township Water System, Lansing, Kan., August H. Matzeder, treasurer, care of R. M. LaFollette, Finance Building, Kansas City, Mo., consulting engineer, plans pipe lines for water system in district bounded by Limit Street, Lawrence Road and Missouri River, and other waterworks installation. Cost about $700,000, of which $250,000 will be arranged by bond issue and remainder secured through Federal aid. Engineer noted is in charge.

Jackson County Public Water Supply District No. 5, Independence, Mo., plans pipe lines for water system in Greenwood community. Cost about $50,000. Work scheduled to begin soon.

Rawlins, Wyo., plans pipe line extensions and replacements in water system and other waterworks installation. Cost about $50,000. Financing is being arranged through Federal aid.

Water Department, San Diego, Cal., plans expansion in water system to cost about $1,300,000, with several new lines, as follows: about 14,000 ft. of 42-in. for connection between Murray reservoir and El Capitan pipe line, cost about $250,000; 4200 ft. of 36-in. for connection between University Heights reservoir and pipe line on Upas Street, about $80,000; 10,800 ft. of 30-in. for connection between Bonita and main Otay lines, $120,000; 24,500 ft. of 24-in. from University Heights reservoir to connection with present line at Old Town bridge, $250,000; 8000 ft. of 24-in. in Eleventh Avenue Canyon, connecting Upas Street line with downtown distribution system at A Street, about $100,000; about 9700 ft. of 18-in. from Upas Street and Pacific Highway to Taylor Street, about $95,000; 27,000 ft. of 16-in. from Pacific Beach reservoir to Taylor and San Diego Street, $190,000; 9500 ft. of 16-in. from Bonita pipe line at Hilltop Drive to Main Street, $60,000; 4000 ft. of 16-in. from Facific Highway to Lindbergh air field district for fire protection system, $30,000; 4500 ft. of 16-in. in La Jolla Shores Road, to replace present woodstave pipe line, $30,000; and 5000 ft. of 12-in. in part of Dwight Street, $20,000. It is proposed to arrange early bond election to vote bond issue in gross amount noted. Fred D. Pyle is city hydraulic engineer. Fred Rhodes is city manager.

Long Beach, Cal., has awarded 8016 ft. of 30-in. pipe to American Cast Iron Pipe Co., Los Angeles. Erroneously reported awarded on steel alternate last week.

Oakland, Cal., East Bay Municipal Utility District, has awarded 154 tons of 10 and 16-in. pipe to United States Pipe & Foundry Co., San Francisco (L. S. 252).

Pipe Lines

Illinois Natural Gas Co., Glenarm, Ill., plans new 3-in. welded steel pipe line from connection with lateral line serving Peoria, Ill., to Morton, Ill., about seven miles, for natural gas distribution at latter place, where control station, meter house and other operating facilities will be installed. Also, new 2-in. welded steel pipe line from connection with lateral line leading to Champaign, Ill., to city limits of Villa Grove, Ill., close to four miles, for natural gas distribution at last noted municipality, where operating structures and facilities will be provided.

Water Department, San Diego, Cal., plans 48-in. steel pipe line from new dam to be built on San Vicente Creek, near Lakeside, to connection with city water system for main line. Entire project is estimated to cost $3,560,000, of which $500,000 will be used for pipe line and remainder for dam construction. Election will be held soon to vote bond issue for work. Fred D. Pyle is city hydraulic engineer.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, plans new 8-in. welded steel pipe line from connection with present line between Davis and Spreckels, Cal., to point near Woodland, Cal., for natural gas transmission. Cost over $75,000.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Sept. 20 for 12,000 ft. of 14-in. spiral welded steel pipe and fittings for Department of Chemical Engineering, Columbia, Tenn.

McAllen, Tex., has let contract to Texas Automatic Sprinkler Co., 2330 Summers Street, Dallas, Tex., for pressure pipe line system for natural gas distribution. Bond issue of $125,000 has been authorized for project. Garrett Engineering Co., 308 Hughes Street, Houston, Tex., is consulting engineer.

Moss Point, Miss., has approved bond issue of $80,000 for pressure pipe line system for natural gas distribution, with control station and other operating facilities.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100 lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES									(Coatesville and Claymont = 2.10¢)						
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.25¢	3.25¢													
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05

	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. inclusive	62
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. through 1½ in.	62	62
1⅝ in. and larger	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	75 and 10
Stove bolts in packages, with nuts attached	75
Stove bolts in bulk	83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland. Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Sept. 4	Sept. 5	Sept. 6	Sept. 7	Sept. 9	Sept. 10
Copper, Electrolytic[1]	11.00	11.50	11.50	11.50	11.50	11.50
Copper Lake	....	11.00	11.00	11.00	11.00	11.00
Tin, Straits, New York	50.625	50.025	50.05	....	50.05	50.05
Zinc, East St. Louis[2]	6.50	6.85	6.85	6.85	6.85	6.85
Lead St. Louis[3]	4.75	4.75	4.75	4.75	4.75	4.75

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	51.75	53.50
Copper		
Electro	12.25	12.125
Castings	12.50	11.875
H. R. sheets*	19.62	19.62
Seamless tubes*	20.12	20.12
Brass		
Yellow, sheets*	18.23	18.23
Yellow, rods*	13.26	13.26
Seamless tubes*	20.98	20.98
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks	12.50	14.00
Lead		
American pig	6.00	5.40
Bar	7.95	8.00
Cut sheets	8.15	8.15
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.25	31.75
Babbitt		
Anti-friction grade	23.50	21.25

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	8.750	9.375
Hvy. and wire	7.750	8.125
Light and bottoms	6.750	7.25
Brass		
Heavy	4.875	5.380
Light	3.875	4.625
No. 1 yel. turn.	4.50	5.50
No. 1 red or compo. turnings	7.125	7.625
Hvy. Mach. compo.	7.375	8.00
Lead		
Heavy	3.875	4.250
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.75	4.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $183-$185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade ..... 2.70c.
Delivered, Detroit ..... 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H't strip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb.
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

YOUR POSITIONED WELDING WILL GO EVEN FASTER
with Murex
TYPE FHP

THE HIGH SPEED ELECTRODE FOR DOWNHAND FILLETS, DEEP GROVE WELDING AND COVER BEADS

Easy to use at high amperages, with either A.C. or D.C. current, this recently developed electrode assures more rapid, more economical welding. Its slag is readily controlled and removes freely so that cleaning time is cut to a minimum and costs are reduced appreciably on heavy work where multi-layer welding is required. At the same time, little spatter is produced, weld surfaces are exceptionally smooth, and neat and good-looking concave fillets and cover beads are the result.

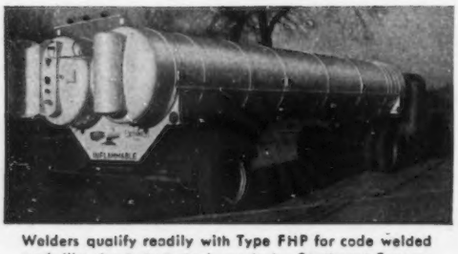
Write for full particulars and ask to have a Murex engineer call and show you what Type FHP can do on your production welding.

METAL & THERMIT CORPORATION, 120 Broadway, New York, N. Y.

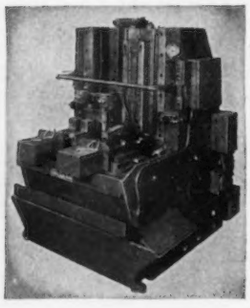
Albany • Chicago • Pittsburgh • So. San Francisco • Toronto

"Murex Electrodes—Thermit Welding—Thermit Metals & Alloys."

Type FHP welds stand the gaff in these stripping tongs made by Shaw-Box Crane & Hoist Co.



Welders qualify readily with Type FHP for code welded work like this butane tank, made by Southwest Factory, Oklahoma City.



Oilgear Company, Milwaukee, builds well-designed, machines; wants clean, neat welds like Type FHP assures.

MUREX HEAVY COATED *Electrodes*
A COMPLETE LINE FOR EVERY WELDING APPLICATION

Investigate Thermit Welding, too—in use since 1902 for heavy repair work, crankshafts, etc.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld. Hot Rolled
1 in. o.d. 13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price=$200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½

Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+30
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

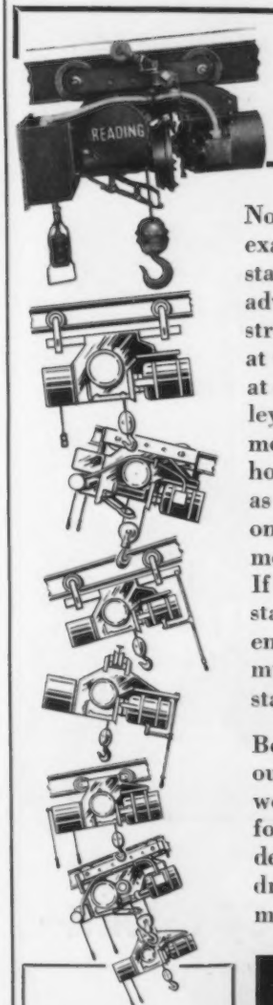
Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.



YOUR CHOICE OF 144 STANDARD ELECTRIC HOISTS

Now you can purchase electric hoists to meet the exact requirements of your plant—and do it at standard equipment prices. That's the big advantage of Reading's Unit Plan of Hoist Construction. By coming to Reading, you can choose at will from 3 standard types of control (or more at slight extra charges), 6 standard types of trolley or stationary suspensions, 2 standard types of motors, 2 standard mountings, and 2 standard hoisting mechanisms. These may be combined as you like in 144 different ways, to give you the one electric hoist best suited to your requirements. Capacities range from 500 lbs. to 2 tons. If your plant is so unusual that none of these standard hoists solve your problem, Reading engineers can usually develop special designs, at much lower costs than usual under such circumstances.

Before purchasing your next electric hoist, find out how Reading's Unit Construction Plan works to give you more satisfactory performance for an equal cost. Send for Bulletin 1004, giving details of the plan, illustrations of the hoists, drawings and dimensions. Without obligation, mail this coupon today.

Other Reading equipment includes Chain Hoists, Specially-Built Electric Hoists, Cranes up to 30 tons, Jib Hoists, Monorails, Wall Hoists and Special Types of Lifting Equipment.

READING

Chain Hoists, Electric Hoists, Cranes and Monorails

THE READING CHAIN & BLOCK CORPORATION
DEPT. 22, READING, PA.

Gentlemen: Without obligation, please send me your Bulletin 1004 on Reading Electric Hoists.

NAME.....TITLE.....

FIRM.....
(Firm Name Must Be Given)

ADDRESS.....

CITY.....STATE.....

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%..	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%....	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%.....	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Caucasian, washed, 52% Mn	60c.
African, Indian, 44 to 48% Mn	51c.
African, Indian, 49 to 51% Mn	56c.
Brazilian, 46 to 48% Mn	53c.
Cuban, del'd, duty free, 51% Mn.	72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	Nom.
Tungsten, domestic scheelite, delivered	Nom.
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	Nom.
Rhodesian, 45%	$23.50
Rhodesian, 48%	27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	25.00 to 25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

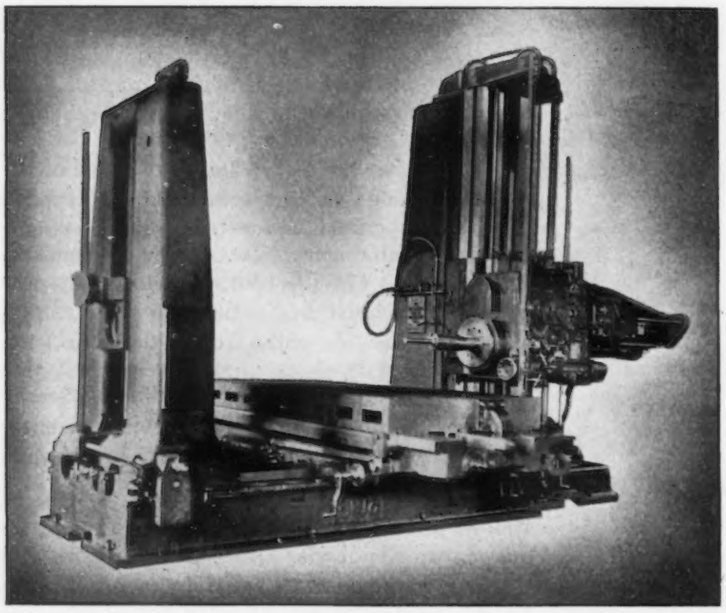
Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

Ohio revolving table units. Built in a complete range of types and sizes, these tables can be adapted to most machine tools.



FOR A PROFITABLE INVESTMENT, CONSIDER--

"Ohio Horizontals"

Built in table and floor types, these powerful, accurate, convenient horizontals merit your careful consideration. Write for bulletin.

THE OHIO MACHINE TOOL CO.

KENTON, OHIO

MANUFACTURERS OF

SHAPERS - OHIO DREADNAUGHT - PLANERS

HORIZONTAL BORING, DRILLING and MILLING MACHINES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed)..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.
For each unit of manganese over 2%, $1 per ton additional.
Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.
The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.
Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots. Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V., del'd $2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f. o. b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....$157.50
Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50
Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville 75.00
Ferromolybdenum, per lb. Mo, f.o.b. furnace..... 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

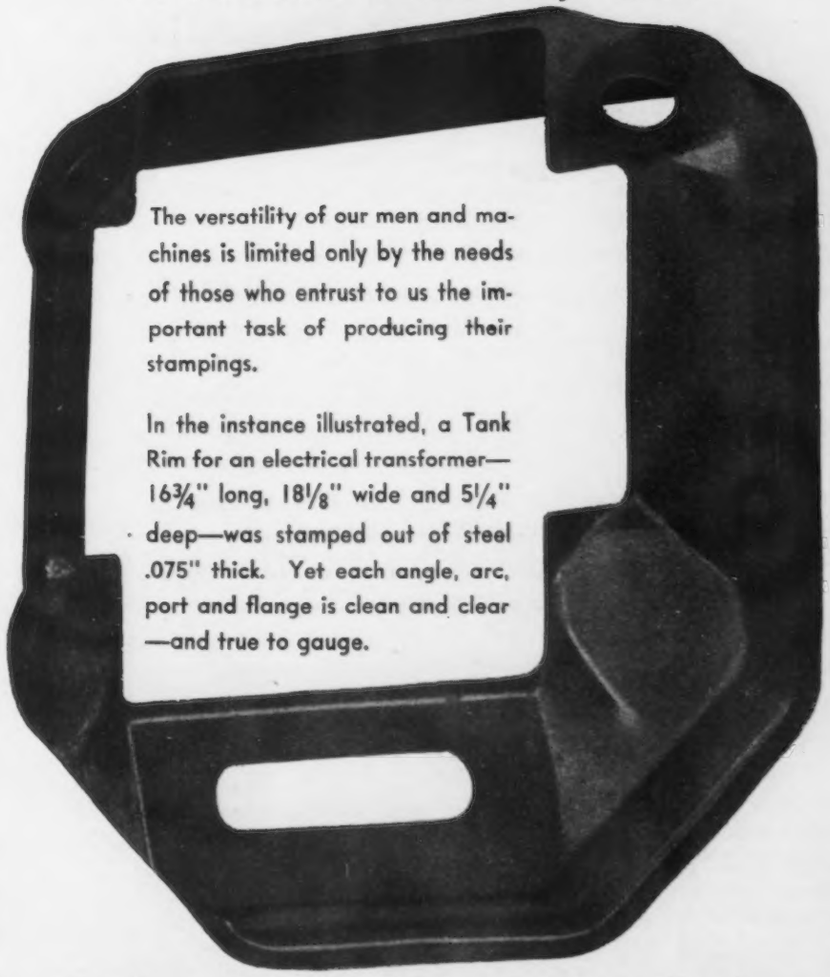
*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.....4.10c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland.5.25c.
No. 4 industrial, del'd Cleveland.5.00c.
No. 5 industrial, del'd Cleveland.3.75c.
No. 6 industrial, del'd Cleveland.3.25c.

LIGHTER GAUGE STAMPINGS, too



The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—16¾" long, 18⅛" wide and 5¼" deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

Let us review your requirements.

PARISH PRESSED STEEL CO.
READING, PA.
PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt .....$4.50 to $4.75

Foundry, f.o.b. Connellsville, prompt .....$5.25 to 5.50

F'dry, by-product, Chicago.... 10.50

F'dry, by-product, New England 12.50

Foundry, by-product, Newark or Jersey City .....$11.30 to $11.90

F'dry, by-product, Philadelphia 11.13

F'dry, by-product, Cleveland... 11.05

F'dry, by-product, Cincinnati.. 10.50

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.

Tin plate, per base box 32s. to 33s.

Steel bars, open hearth £13 9s.

Beams, open hearth.... £12 2s. 6d.

Channels, open hearth.. £12 2s. 6d.

Angles, open hearth.... £12 2s. 6d.

Black sheets, No. 24 gage £18 17s. 6d. max.*; £18 17s. 6d. min.**

Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$24.50***	***$24.00***	***$25.50***	***$25.00***	.....
Brooklyn	***26.50***	.....	.....	***27.00***	.....
Jersey City	***25.53***	***25.03***	***26.53***	***26.03***	.....
Philadelphia	***24.84***	***24.34***	***25.84***	***25.34***	.....
Bethlehem, Pa.	$24.00	$23.50	$25.00	$24.50	.....
Everett, Mass.	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.	24.00	23.50	25.00	24.50	.....
Steelton, Pa.	.....	23.50	.....	.....	28.50
Birdsboro, Pa.	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md.	24.00	23.50	.....	.....	.....
Erie, Pa.	23.00	22.50	24.00	23.50	.....
Neville Island, Pa.	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.	23.00	22.50	23.50	23.00	.....
Buffalo	23.00	22.00	24.00	23.50	28.50
Cincinnati	***23.44***	***23.61***	.....	***24.11***	.....
Canton, Ohio	***24.39***	***23.89***	***24.89***	***24.39***	.....
Mansfield, Ohio	***24.94***	***24.44***	***25.44***	***24.94***	.....
St. Louis	***23.50***	***23.02***	.....	.....	.....
Chicago	23.00	22.50	23.50	23.00	.....
Granite City, Ill.	23.00	22.50	23.50	23.00	.....
Cleveland	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio	23.00	22.50	.....	23.00	.....
Toledo	23.00	22.50	23.50	23.00	.....
Youngstown	23.00	22.50	23.50	23.00	.....
Detroit	23.00	22.50	23.50	23.00	.....
St. Paul	***25.63***	.....	***26.13***	***25.63***	.....
Duluth	23.50	.....	24.00	23.50	.....
Birmingham	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$22.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

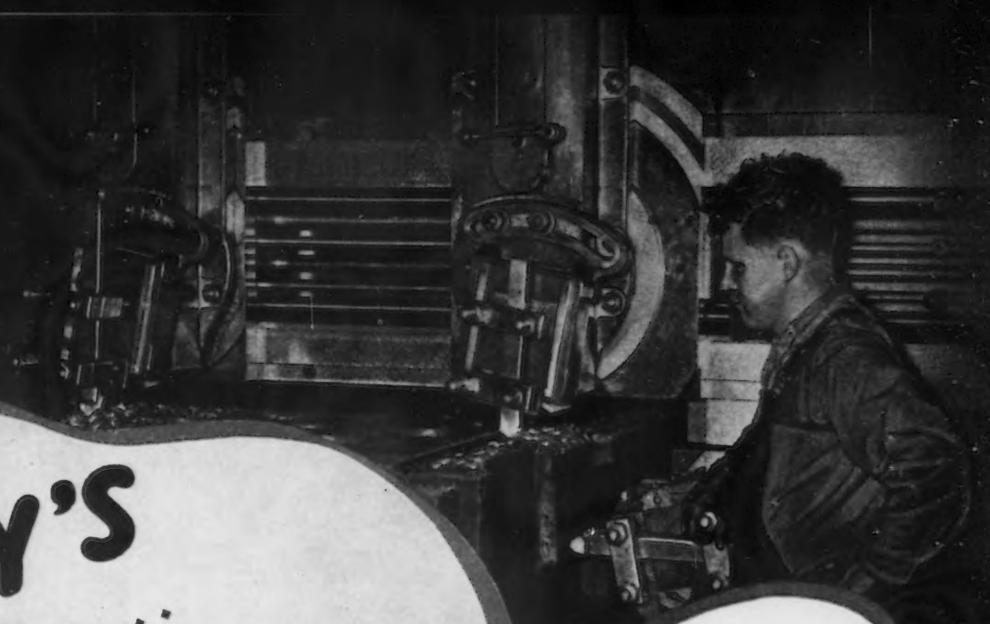
*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.15	$3.05	$3.15	$3.35	$3.38	$3.23	$3.05	$3.51	$3.45	$3.18	$3.30	$3.48	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	....	4.12	4.35	4.43	6.50
Sheets, galvanized	4.75	4.60	4 42	4.50	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	....
Strip, cold rolled	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	....	3.41	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	....	8.52	8.84	8.38	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.



Machine: Convertible open side planer.
Material: Cast Iron (Two castings, 15,270 lbs. each)
Operation: Planing (Interrupted cuts)
Speed: 75 FPM
Feed: .015
Depth of Cut: 3/4"
Tools: REXALLOY Tipped (Two Tools)

*REXALLOY'S extra red hardness ..... and toughness permits FASTER CUTTING SPEEDS

Machine: 20-Foot Boring Mill
Material: Semi Steel Castings, 14' long by 4' to 6' wide
Operation: Roughing Cut (Interrupted Cuts)
Speed: 90 SFM
Feed: 3/32"
Depth of Cut: Over 1" (Divided between two tools)
Tools: REXALLOY Tipped (Two Tools)
Time: 14 Hours (Former time was 18 hours with another material)

ON your production you will find REXALLOY tooling almost invariably results in much faster cutting speeds and greater feeds . . . sometimes 100% increase or more . . . because of REXALLOY'S extreme red hardness. REXALLOY is more wear-resisting than High Speed Steel . . . has proven tougher than other cast tool materials in many applications.

More pieces per grind means less down time

REXALLOY tools . . . solid or tipped . . . hold their cutting edge longer at these faster cutting speeds. This resistance to abrasive wear produces much higher accurate production between grinds . . . as important in small lot work as in long production runs . . . always important where close limits are involved.

Ample toughness for interrupted cuts

REXALLOY *has* the toughness to stand up under many types of interrupted cuts at the higher speeds it permits. Whether your work is turning, boring, facing, forming . . . whether the material is steel, cast iron, bronze . . . whether your runs are long or short . . . get the facts about REXALLOY. Learn how it will increase your machine capacity and decrease your machining costs. Call Crucible . . . there's a Branch or Warehouse near you. Ask about our REXALLOY 30-day free trial offer, based on a study of your problems by a trained, experienced Crucible man. "Call Crucible" today.

**Reg. U.S. Pat. Off.*

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Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

• **Mathieson Alkali Works, Inc.,** 60 East Forty-second Street, New York, has approved plans for one-story addition to branch plant at Niagara Falls, N. Y. Cost close to $400,000 with equipment.

Schenectady Varnish Co., Inc., Congress Street, Schenectady, N. Y., has let general contract to Hanrahan Brothers, 952 Wendell Street, for new two-story plant, 40 x 125 ft. Cost close to $75,000 with equipment.

Quartermaster, Fort Slocum, N. Y., asks bids until Sept. 19 for addition to steam power house, with installation of boiler unit and auxiliary equipment.

Jacob Ruppert, 1639 Third Avenue, New York, brewer, will take bids soon on general contract for one-story storage and distributing plant at Hamden, Conn., 90 x 135 ft., with service and garage facilities. Cost over $50,000 with equipment.

Singer Engineering Co., 242 Mott Street, New York, tools, dies, etc., for aeronautical industry, has purchased one-story building at 35-37 Ellis Avenue, Irvington, N. J., for plant.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Sept. 19 for 200 to 300 37-mm. gun barrels (Circular 122).

Curtiss-Wright Corp., 30 Rockefeller Plaza, New York, aircraft, has plans for new works on about 200 acres near Lockland, Cincinnati, recently acquired, to be operated by its airplane engine division, Wright Aeronautical Corp., Paterson, N. J., for production of Wright cyclone engines for Federal Government. Company has arranged for loan with RFC for about $32,000,000 for project, of which approximately $8,000,000 will be used for purchase of machine tools, small tools and other equipment.

Rare Chemicals, Inc., Yonkers, N. Y., industrial and other chemical products, has let general contract to Wigton-Abbott Corp., 60 East Forty-second Street, New York, for new one and two-story plant, 60 x 220 ft., and 60 x 120 ft., at Middlesex, N. J. Cost over $75,000 with equipment.

New York Shipbuilding Corp., Fairview Street, Camden, N. J., has let general contract to Leonard Shaffer, 1310 Spruce Street, Philadelphia, for two-shop addition. Cost over $50,000 with equipment.

Tube Reducing Corp., 24 Grafton Avenue, Newark, N. J., carbon steel and alloy steel tubing, etc., plans one-story addition, for which superstructure will begin soon. Cost over $350,000 with equipment.

Sun Oil Co., 1608 Walnut Street, Philadelphia, has asked bids on general contract for new bulk oil storage and distributing plant at Willow Grove, Pa., with steel tanks and other facilities. Cost over $75,000 with equipment.

Cramp Shipbuilding Co., Richmond and Norris Streets, Philadelphia, recently organized to take over plant and property of William Cramp & Sons' Ship & Engine Building Co., idle for several years, plans modernization in shipways, shops and other structures, with increase in present facilities, for construction of vessels for Federal Government. Financing is being arranged through sale of 249,029 shares of stock, close to $1,000,000 of proceeds, for plant purposes noted. Day & Zimmerman, Inc., Packard Building, is consulting engineer.

Parish Pressed Steel Co., Weiser Street, Reading, Pa., heavy steel stampings, automobile frames, etc., has let general contract to L. H. Focht & Son, Inc., Baer Building, for one-story addition for expansion in steel-treating department. Cost close to $85,000 with equipment. W. J. Senner, last noted address, is engineer. Company is a division of Spicer Mfg. Corp., Toledo, Ohio.

Gehnrich & Gehnrich, Inc., 32-32 57th Street, Woodside, N. Y., manufacturer of industrial ovens, is building an addition to its plant. Cost about $10,000.

Buffalo District

• **Spencer Lens Co.,** 19 Doat Street, Buffalo, optical instruments and equipment, has let general contract to Gillmore-Carmichael-Olson Co., 1873 East Fifty-fifth Street, Cleveland, for three additions to plant on Eggert Road, one-story, 210 x 420 ft., for prism and lens manufacturing divisions; two and three-stories, 40 x 210 ft., for an assembling department; and one-story, 30 x 180 ft., for mechanical parts production division. Capacity will be increased about 50 per cent, a large part to be used for precision instrument manufacture for Government. Cost about $1,250,000, of which close to $700,000 will be expended for equipment.

Dow & Co., Inc., Court and Wilkeson Streets, Buffalo, road and highway equipment, has engaged Hudson & Hudson, Rand Building, architects and engineers, to prepare plans for one-story addition, 100 x 160 ft., for storage and distribution. Cost over $50,000 with equipment.

New England

• **Jacobs Mfg. Co.,** 2074 Park Street, Hartford, Conn., drill chucks, tools, etc., has let general contract to R. G. Bent Co., 93 Edwards Street, for new one and two-story plant near Newington Road, including office unit. Cost about $300,000 with equipment. Company will remove to new location and increase capacity. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Remington Arms Co., Inc., Barnum Avenue, Bridgeport, Conn., has let general contract to Edwin Moss & Son, 555 Grant Street, for two one-story additions, about 33,000 sq. ft. of floor space, for compounding and production of priming mixtures, and for expansion in cartridge-manufacturing division, respectively. Cost close to $200,000 with equipment.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Sept. 16 for 90-mm. anti-aircraft gun mounts, in lots of 125 to 250, and 451 to 500, respectively (Circular 111).

Heald Machine Co., New Bond Street, Worcester, Mass., machine tools and parts, has let general contract to E. J. Cross Co., Inc., 150 Prescott Street, for new steam power house, one and multi-story, 50 x 105 ft. Cost close to $90,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Washington District

• **Bureau of Yards and Docks,** Navy Department, Washington, will begin superstructure soon for one-story addition to machine shops at Norfolk Navy Yard, Va., for which general contract recently was let to Rust Engineering Co., Pittsburgh, at $720,000, exclusive of equipment. Bids are being asked (no closing date stated) for extensions and improvements in heating plant and system at Naval hospital, Portsmouth, N. H. (Specification 10083).

Locke Insulator Corp., 2501 South Charles Street, Baltimore, electrical insulators, has asked bids on general contract for one-story addition, 86 x 100 ft., for storage and distribution. Cost close to $45,000 with equipment. W. S. Austin, Maryland Trust Building, is engineer.

Calvert Distilling Co., Relay, Md., has asked bids on general contract for an addition to steam power house. Cost over $50,000 with equipment. Smith, Hinchman & Grylls, Marquette Building, Detroit, are consulting engineers.

Quartermaster, Fort Belvoir, Va., plans oil storage and distributing building and facilities, shop, warehouses and other buildings. Bids to be asked soon. Fund of $192,489 has been authorized for project.

Mead Corp., Heald Division, Lynchburg, Va., paper board products, plans one-story addition to paper mill, 100 x 300 ft. Cost over $85,000 with equipment. Main offices are at Chillicothe, Ohio.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 17 for 14 electric arc welding sets and 80 electric arc welding control panels (Schedule 2908) for Eastern and Western Navy yards; two motor-driven radial drilling machines (Schedule 2919) for Puget Sound yard; two motor-driven sensitive precision lathes (Schedule 2950) for San Diego Naval Air Station.

Bureau of Yards and Docks, Navy Department, Washington, has plans for one-story torpedo assembling plant at naval station, Newport, R. I., for which an appropriation of $750,000 has been authorized for buildings and equipment. Also for vocational training schools at naval air stations at Miami and Pensacola, Fla., each to cost about $100,000 with equipment for which appropriations are available.

South Atlantic

• **Midland Aircraft Co.,** 134 North LaSalle Street, Chicago, airplanes and parts, has acquired, through Chamber of Commerce and Sumter County Board of Commissioners, Americus, Ga., about 20 acres near Southern Field, Americus, for new plant for parts production and assembling. Cost over $350,000 with equipment.

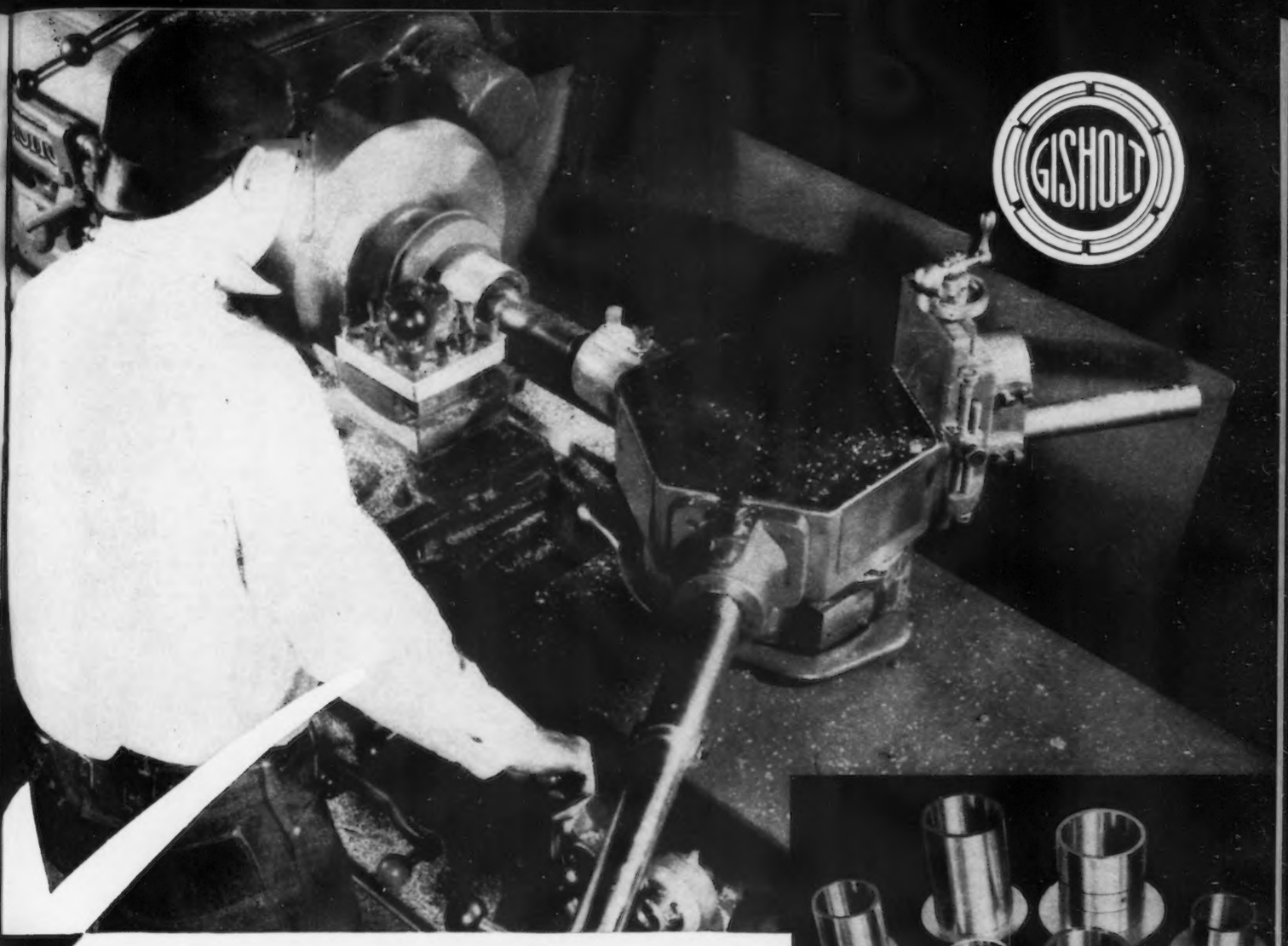
Commanding Officer, Ordnance Department, Charleston Ordnance Depot, Charleston, S. C., has secured appropriation of $179,900 for extensions and improvements in shops and other buildings, including modernization of structures, and equipment installation.

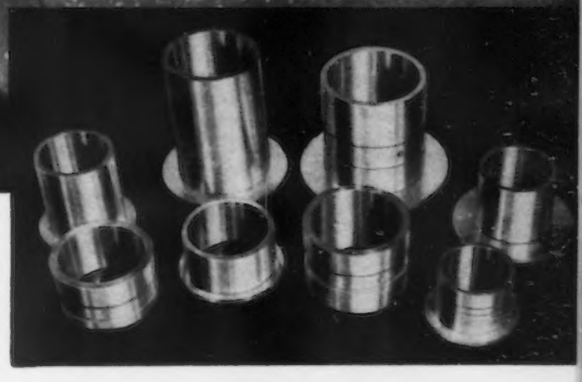
Bureau of Yards and Docks, Washington, plans extensions in gasoline storage and distribution facilities at naval air station, Jacksonville, Fla., including tanks, pipe lines, etc. Fund of $250,000 has been authorized.

South Central

• **H. L. Hunt,** Dallas, Tex., care of Hudson Engineering Corp., 2711 Danville Street, Houston, Tex., is at head of project to build and operate a new gas recycling plant in Cotton Valley, La., gas field area, including compressor station, power house, pumping station, steel storage tanks and other facilities. Cost over $1,500,000 with machinery. Several oil companies are interested in project, including Magnolia Petroleum Co., Magnolia Building, Dallas; United Gas Corp., United Gas Building, Houston, and others. Engineer noted will be in charge of design and construction.

Jefferson Island Salt Co., 401 West Main Street, Louisville, plans rebuilding part of salt-mining, storage and distributing plant at Jefferson Island, La., recently destroyed by fire. Loss over $500,000 with equipment.





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Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Sept. 16 for four or more electric centrifugal pumping units for department of chemical engineering, two units to be of vertical-shaft, dry-well suction type, and remainder of horizontal, closed impeller type; capacity from 150 to 2500 gal. per min., under heads varying from 75 to 440 ft.

Southwest

• **Stearman Aircraft Co.,** Wichita, Kan., military and other airplanes, plans increased capacity for production of aircraft for Government, including one-story units for parts production, assembling and testing. Cost close to $2,500,000 with equipment, in which amount financing has been arranged through RFC. Company recently has awarded general contract to Walter Armogost, Kauffman Building, for four one-story additions, to cost about $200,000 with equipment.

Kansas City Power & Light Co., 1330 Baltimore Avenue, Kansas City, Mo., has asked bids on general contract for one-story equipment storage and distributing building, 60 x 120 ft. Cost close to $40,000 with equipment.

City Council, Pine Bluff, Ark., plans steel hangars with shops and reconditioning facilities, oil and gasoline storage and distributing facilities, and other structures at new municipal airport. Bond issue of $200,000 has been approved.

Beech Aircraft Corp., Wichita, Kan., plans one-story additions to double present capacity in parts manufacture and assembling divisions. Cost about $400,000 with equipment.

F. H. Maloney Co., 2301 Prairie Street, Houston, Tex., pump valves, piston rings and kindred engineering products, will take bids soon on general contract for one-story addition, 100 x 100 ft. Traveling crane will be installed. Cost over $70,000 with equipment. Francis J. Niven, 2306 Crawford Street, is engineer.

Gulf States Oil Co., Chronicle Building, Houston, Tex., has approved plans for new gas recycling plant to handle gas and distillate from company wells in San Salvador oil field, near Edinburg, Tex. It will include compressor station, power house, pumping plant, steel tank storage facilities and other structures. Pipe line gathering system will be installed. Cost close to $300,000 with machinery.

Western Pa. District

• **Superior Steel Corp.,** Grant Building, Pittsburgh, has let general contract to Pittsburgh Industrial Engineering Co., Thirty-ninth Street and Allegheny Valley Railroad, for one-story addition to plant at Carnegie, Pa., 75 x 100 ft. Cost over $65,000 with equipment.

Bessemer & Lake Erie Railroad Co., Union Trust Building, Pittsburgh, plans one-story addition to machine and erection shop at locomotive works, Greenville, Pa. Cost close to $60,000 with equipment.

Universal Cyclops Steel Corp., Bridgeville, Pa., has asked bids on general contract for one-story addition to Cyclops Division plant, Titusville, Pa., 50 x 100 ft., for expansion in pickling department, and storage and distribution. Cost over $50,000 with equipment.

Ohio and Indiana

• **North American Mfg. Co.,** 2910 East Seventy-fifth Street, Cleveland, industrial oil and gas burners and equipment, has asked bids on general contract for two-story addition, about 14,000 sq. ft. floor space. Cost over $50,000 with equipment. H. M. Morse Co., 1500 Superior Avenue, is architect and engineer.

Hilton-Davis Chemical Co., Langdon Street and Pennsylvania Railroad, Cincinnati, industrial chemicals, is arranging for sale of stock, of which about $380,000 from proceeds will be used for expansion and improvements in plant, including additional equipment.

General Motors Corp., Diesel Engine Division, 2160 West 106th Street, Cleveland, diesel engines and parts, has let general contract to Austin Co., Cleveland, for main one-story addition, 275 x 360 ft., and smaller unit, for expansion in marine diesel department. Cost over $250,000 with equipment.

Thompson Grinder Co., 1534 West Main Street, Springfield, Ohio, surface grinders, special machinery and parts, has let general contract to C. B. Farish & Son, Springfield, for one-story addition, 100 x 120 ft. Cost over $70,000 with equipment. Lloyd J. Zeller, 2 West Columbia Street, is architect.

Warner & Swasey Co., 5701 Carnegie Avenue, Cleveland, machine tools, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for one-story addition, about 30,000 sq. ft. of floor space. Cost about $600,000 with equipment. This is third plant expansion during present year, other units adding about 80,000 sq. ft. of floor space.

Allison Engineering Division, General Motors Corp., Speedway City, Indianapolis, aircraft motors and parts, has let general contract to National Concrete Fireproofing Co., Citizens' Building, Cleveland, for one-story addition, 96 x 400 ft., for storage and distribution; also for two one-story office buildings. Entire cost close to $200,000 with equipment. Lloyd Allen and John R. Kelley, Architects' and Builders' Building, are architects.

Sibley Machine & Foundry Corp., 202 East Tutt Street, South Bend, Ind., plans one-story addition, 50 x 100 ft., for foundry expansion. Cost about $45,000 with equipment. William E. Fett, 914 Washington Avenue, Mishawaka, Ind., is engineer.

Michigan District

• **Jackson Crankshaft Division,** Muskegon Motor Specialties Co., Jackson, Mich., has let general contract to North-Moller Co., Jackson, for one-story addition. Cost over $60,000 with equipment. Russell Allen, Jackson, is architect.

Simplicity Engineering Co., Durand, Mich., vibrating screens, sand aerators and kindred equipment, has let general contract to Henry W. Martens Co., 2111 Woodland Avenue, for one-story addition, 75 x 200 ft. Cost over $75,000 with equipment.

Middle West

• **Electro-Motive Corp.,** La Grange, Ill., diesel engine-driven locomotives, has asked bids on general contract for one-story addition, 250 x 300 ft., partly for testing division. Cost over $500,000 with equipment.

Furnas Electric Co., 827 South Seventy-second Street, West Allis, Wis., controls for electric motors and kindred electrical products, has approved plans for new one-story plant, 50 x 300 ft., at Batavia, Ill. Cost over $85,000 with equipment. Ross Buck, North View Avenue, Aurora, Ill., is architect.

Central Screw Co., 3501 South Shields Avenue, Chicago, bolts, nuts, screws, etc., has let general contract to B. W. Handler Construction Co., 1261 South State Street, for one-story addition, 105 x 280 ft., for general production, storage and distribution. Cost close to $70,000 with equipment.

Estherville Packing Co., Estherville, Iowa, meat packer, has let general contract to W. A. Klinger, Warnock Building, Sioux City, Iowa, for one-story addition, 72 x 75 ft. Cost about $45,000 with equipment.

Kempsmith Machine Co., 1819 South Seventy-first Street, Milwaukee, milling machines and parts, vises, etc., has let general contract to Charles Maier & Son Co., 5114 West Center Street, for one-story addition, 55 x 185 ft. Cost about $75,000 with equipment. L. P. Vogt, 333 South Sixteenth Street, is architect.

Nebraska Consolidated Mills Co., 1521 North Sixteenth Street, Omaha, Neb., has asked bids on general contract for new branch flour mill at Decatur, Ala., with grain elevator of 400,000 bu. capacity. Cost close to $300,000 with equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., are consulting engineers.

Cruver Mfg. Co., 2454 West Jackson Boulevard, Chicago, plastic products, plans one-story addition, 66 x 125 ft. Cost over $55,000 with equipment. C. C. Henderson, 134 North LaSalle Street, is architect.

Duluth, Missabe & Iron Range Railway Co., Wolvin Building, Duluth, Minn., has let general contract to Polaris Concrete Products Co., 6010 Medina Street, for new engine house with shop and repair facilities at Two Harbors, Minn. Cost about $65,000 with equipment.

Fairbanks, Morse & Co., Beloit, Wis., is having plans drawn by O. D. Conover, Cleveland, architect and industrial engineer, for new non-ferrous foundry, 80 x 220 ft., which will increase capacity about three times.

LeRoi Co., West Allis, Wis., has awarded contract to Klug & Smith for one-story addition, 40 x 170 ft., for storage.

Pacific Coast

• **Norris Stamping & Mfg. Co.,** 960 East Sixty-first Street, Los Angeles, sheet metal stampings, dies, etc., has let general contract to Ted R. Cooper Co., 1031 South Broadway, for new one-story plant, 120 x 500 ft., on Boyle Avenue, Vernon district. Cost close to $125,000 with equipment.

Lindsay Ripe Olive Co., Landsay, Cal., has let general contract to Latistell Corp., 3110 East Foothill Boulevard, Pasadena, Cal., for one-story addition to packing plant, 145 x 190 ft., for storage and distribution. Cost over $60,000 with equipment.

Industrial Air Products Co., 1011 S.W. Vista Street, Portland, industrial oxygen, etc., has leased one-story building to be erected by Morris Schnitzer, address noted, in Yeon district, for plant. Cost about $45,000 with equipment. L. L. Dougan and Bernard Heims, 1326 S.W. Columbia Street, are architects.

Amalgamated Sugar Co., Nyssa, Ore., beet sugar products, plans one-story addition for storage and distribution. Cost about $80,000 with mechanical-handling and other equipment. Main offices are at Ogden, Utah.

Douglas Aircraft Corp., Santa Monica, Cal., has let general contract to Atlas Construction Co., 1470 Paloma Street, Pasadena, for one-story addition, 140 x 210 ft., with two 40-ft. wing extensions, to branch plant at El Segundo, Cal.; 60-ft. crane runway will be installed. Cost over $200,000 with equipment. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architects and engineers.

General Engineering & Drydock Co., Clement and Schiller Streets, Alameda, Cal., will begin superstructure for two-story shop addition, with storage and distributing facilities, for which general contract recently was let to Christensen & Lyon, 2009 Pacific Avenue, Oakland. Cost about $50,000 with equipment.

Canada

• **Canadian Pratt & Whitney Aircraft Corp.,** Lorne Avenue, Longuemil, Que., has let general contract to A. F. Byers & Co., Ltd., 1226 University Street, Montreal, Que., for one-story addition for expansion in propeller division. Cost over $80,000 with equipment.

Hayes Steel Products, Ltd., Merritton, Ont., has let general contract to Ontario Construction Co., Ltd., 31 Queen Street, St. Catharines, Ont., for one-story addition, 100 x 200 ft., to be used as a machine shop. Cost about $75,000 with equipment. A. E. Nicholson, 46 Queen Street, St. Catharines, is architect.

Modern Tool Works, Ltd., 15 Van Horne Street, Toronto, Ont., tools, dies, jigs, special machinery, etc., plans one-story addition. Cost close to $50,000 with equipment.